HD
211
.03
J4
1979

DEC 1990

JERUSALEM TOWNSHIP

LAND USE/IMPACT PLAN

DECEMBER 31, 1979

Property of CSC Library

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

HD
211
.O3
J4
1979

This document was funded in part through the Coastal Zone Management Act of 1972, as amended (Coastal Energy Impact Program), provided by the U. S. Dept. of Commerce, NOAA, through the Ohio Department of Energy.

The preparation of this report was financed in part through a Coastal Energy Impact Program Grant, 308(c), from the Ohio Department of Energy.

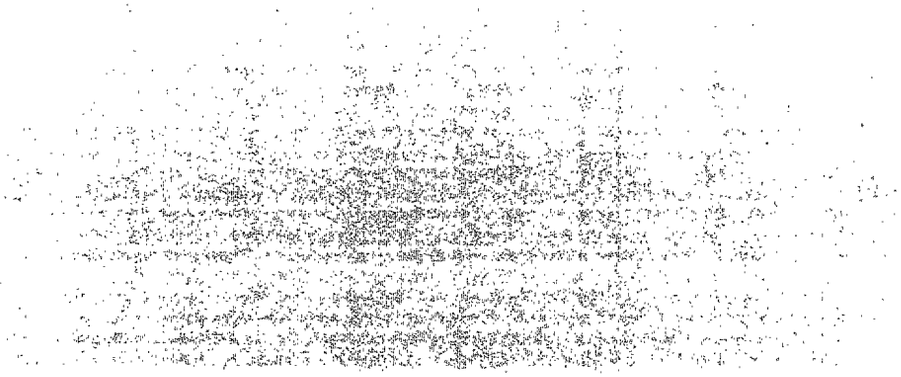
December 31, 1979.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

CHAPTER 1

introduction



HISTORY OF THE LAND USE ALLOCATION SYSTEM

The Land Use Allocation System (LUAS) was adopted by the Toledo-Lucas County Plan Commissions in the latter part of 1976 as the primary system for developing general land use plans for Toledo and Lucas County. The Commissions recommended the application of the LUAS to current planning decisions wherever possible.

The Land Use Allocation System (LUAS) quantitatively evaluates the suitability and capability of the land for development. This approach provides an objective method of making comparisons and trade-offs in place of more traditional, intuitive and subjective methods.

The LUAS considers capability and suitability factor to be of equal importance in its impact on each parcel of land. It attempts to balance the economics of suitability factors with the environmental traits of capability ones. The integration of the two is significant because it prevents a one-sided look at the area. The economic investment put into land is not overlooked in favor of its environmental features, or vice versa.

In a preliminary attempt to look rationally at the land use conflicts using the LUAS, a pilot study was undertaken for Monclova Township. The suitability analysis was used to determine "ideal" uses over the long term in an area where classic land use conflicts exist.

This system attempts to consider all the major factors affecting development of land and, by a rational method, make trade-offs between them. If all the factors are considered of equal weight, the best social and economic use of the land will be apparent without making unnecessary, irreversible sacrifices. Consequently, the system goes beyond natural resource features, as is usual for capability analysis, to include ten factors which should determine the ultimate ideal land use. (1-current use, 2-special use, 3-proximity, 4-soil, 5-topography, 6-flood plain, 7-visual amenities, 8-utilities (sewer), 9-noise, and 10-access.)

Using a geographical technique each parcel received five scores, one for each of the land use categories: agricultural, residential, recreational, commercial, and industrial. The land use receiving the highest score was then assigned to the whole district.

The land use map resulting from the land use allocation system then is, at a large scale, the "ideal" land use for any given area. It is not meant to be used for determining the use for individual pieces of land.

The LUAS represents the impact of the suitability and capability factors on the land's development potential or desirability. Once the analysis was completed, work began on adapting the results of the system into a land use plan. Using the projected acreage needs for land uses in the year 2000, plus other evaluations, the "preferred" uses are developed into a plan.

Land Use Allocation System: A Pilot Study, was approved by

the Commissions and released to the public in December, 1976. Another study, the Toledo Land Use Plan, deals with the application of the Land Use Allocation System (LUAS) to the vacant land within the City of Toledo, producing a "preferred" use (residential, commercial, industrial or park/open space) for each parcel.

Having been successfully used in several instances, the LUAS was again used in the preparation of land use plans for Springfield Township (1978) and Waterville Township (1979). These land use plans were prepared specifically to meet the needs of the individual Township. In several instances, the LUAS system was modified to address particular problems and concerns which are unique to each area.

The LUAS is now being applied to Jerusalem Township, with modification to utilize the Ohio Department of Natural Resources computer mapping and information storage system, OCAP (Ohio Capability Analysis System).

CHAPTER 2

goals and objectives

JERUSALEM TOWNSHIP LAND USE

GOALS AND OBJECTIVES

Toledo-Lucas County Plan Commissions has taken the approach of developing an area-wide land use plan, township by township, using the adopted development policies as guidelines to ensure coordinated development throughout the County.

The "Lucas County Policy Plan" divides the County into five zones based on area needs, available services, projected growth and timed orderly development of land uses. Policies and a program for land use management were formulated for each zone. (For a more complete breakdown and analysis see the "Lucas County Policy Plan for Land Use and Housing, Toledo-Lucas County Plan Commissions, March, 1979.")

Located in the eastern portion of Lucas County, Jerusalem Township is primarily agricultural in character. Because of this, the Township has been designated as an Agricultural Zone by the "Lucas County Policy Plan." According to these adopted policies, the goals and objectives for this zone are as follows:

Goal - to maintain the Agricultural Zone in low intensity uses, and in long term agriculture use as an active industrial base of Lucas County's economy.

Objective - To maintain a stable population.

- to revise or reject proposals for urbanizing infrastructures, such as sewer and water.

While it is possible to state in general terms the goals and objectives for Lucas County as a whole, each Township has its own unique characteristics that must be addressed. To be effective, a planning program must interpret the basic desires and goals of the people who make up the

community. It must also provide workable solutions to achieving those goals.

The proposed goals and objectives for Jerusalem Township are meant to be guidelines. If the township planning program is to be something more than a confusion of opinions or disorganized ideas, then criteria for the physical development of the township must be carefully formulated. Establishing guidelines will help to maintain old and to mold new development, and insure a future of orderly, prosperous and attractive development. These guidelines will help township officials and citizens to take imaginative and constructive steps in creating Jerusalem Township's future form.

The following goals and objectives were developed through various meetings with concerned residents, citizens, and township officials.

GOAL 1: To provide for a pleasant, satisfying and attractive living and working environment.

Objective 1A - Develop a Land Use Plan that will encourage; convenient shopping and service areas; ample open space and recreation areas; decent housing; adequate public facilities; and a safe and convenient transportation system.

Objective 1B - Develop within the township good housing for all families and age groups.

Objective 1C - Establish and enforce good zoning and building standards which relate to new and existing residential, commercial/industrial, and recreational development.

Objective 1D - Provide for an ecological balance between farm land, development and natural areas (waterways, woods).

Objective 1E - Protect the waterways and wooded areas of the township as much as possible to preserve the aesthetic qualities.

Objective 1F - Develop the Township so that all parcels of land abut, or have access to, a public right-of-way.

Objective 1G - Regulate pond development to protect the public health, safety and welfare of Township residents.

GOAL 2: To encourage interaction, cooperation and coordination between citizens and various government agencies.

While the township government provides the basis for many development decisions, other governmental jurisdictions make significant contributions to the development of a community. School districts provide school facilities and certain recreation areas. The county supports various services, such as road construction and maintenance, police protection, and county parks. The state and federal governments control various interstate and major highways, and wildlife areas. Also neighboring communities can affect development by the types of land uses allowed adjacent to the township's boundaries. It is paramount that cooperation and coordination exist among the various levels of government, so that efforts by the public officials will relate to a common goal. These objectives, as related to Jerusalem Township, are:

Ojbective 2A - Coordinate growth and development of Jerusalem Township with adjoining townships, cities, and the county as a whole.

Objective 2B - Coordinate efforts in developing community facilities between state, county, and township officials.

Objective 2C - Work closely with county and state agencies in developing a safe, efficient transportation system to connect the township with other developed areas in the region and state.

Objective 2D - Work with Lucas County in the planning and regulation of on-site sewer and water systems in areas where soils are suitable for development.

Objective 2E - Work toward better police protection and security within the township.

Objective 2F - Encourage and promote citizen participation in township matters.

Objective 2G - Work in cooperation with the Toledo-Lucas County Plan Commission on land use matters that effect Jerusalem Township.

GOAL 3: To insure the preservation and provision of adequate agricultural lands for the future.

Objective 3A - Provide effective zoning of agricultural areas to prevent conflicts with other land uses, and preserve the rural character of the township.

Objective 3B - Coordinate land uses and development, so as to preserve prime agricultural lands.

Objective 3C - Encourage use of the farmland tax abatement program, and adopt zoning that will be favorable to the preservation of agricultural lands.

GOAL 4: To preserve and protect critical natural areas (wetlands, flood plain) and sites of historic and archeological significance.

Ojbective 4A - Provide for the use of regulatory measures to safeguard the township from pollution of its natural resources.

Objective 4B - Establish a special protection or conservation district in the zoning resolution to regulate natural areas (ex. filling, grading, leveling).

This type of zoning can be used to "prevent harm to public rights by limiting use of private property to those uses for which it was suited in its natural state" (Just v. Marinette County (1972), 56 Wis. 2d 7, 201, N.W. 2d 761). "Permitted," "conditional," and "prohibited uses" can be used to zoning "special protection district" which will protect the special qualities and features of natural areas.

Objective 4C - Develop a flood plain district to regulate development within the flood plain and protect the public health, safety and welfare of township residents.

Objective 4D - Provide for the review of developments which infringe upon sites of Historical or archeological significance.

Objective 4E - Provide for the protection of Historic and archeological site located within Jerusalem Township.

GOAL 5: To provide safe, decent and sanitary housing so that all persons can buy or rent suitable living quarters.

Objective 5A - Provide effective protection for residential areas to insure desirable standards.

Objective 5B - Provide a full range of housing types within the township to meet the demands of all age groups and living habits.

Objective 5C - Require that suitable and adequate transition areas, barriers, or buffers be established between conflicting land uses as needed, to promote the public safety and attractiveness of the township.

Objective 5D - Protect residential areas from unnecessary through traffic and intrusion of unrelated land uses.

Objective 5E - Pursue a program of township-wide conservation and uniform code enforcement to upgrade or eliminate sub-standard housing and to maintain the sound condition of the remaining housing stock.

Objective 5F - Develop residential areas so they do not infringe on prime agricultural lands.

Objective 5G - Encourage new housing construction in established residential areas to discourage large lot single family frontage development elsewhere along major township roads.

Objective 5H - Regulate strip residential growth so that interior lands are not cut-off from future development, or conflict with existing agricultural uses.

Objective 5I - Permit multiple dwellings with proper control of site planning, maintenance and location. (This may be accomplished through zoning, with site plan review being required before building permits are issued.)

Objective 5J - Allow multi-family or residential developments only when and where adequate sanitary systems can be provided.

GOAL 6: To assure a complete range of commercial/industrial goods and services, and broaden the employment opportunities within Jerusalem Township.

Objective 6A - Discourage cluttered highway frontage, with random shopping strips of various size scattered throughout the township.

Objective 6B - Set aside adequate amounts and properly located lands for future commercial and industrial needs.

Objective 6C - Regulate commercial/industrial development within the township to the extent that it will have minimal adverse effects on the surrounding property, through the use of site plan review.

Objective 6D - Require commercial/industrial uses to provide barriers or buffers between themselves and residential uses.

Objective 6E - Concentrate the future commercial/industrial growth of Jerusalem Township in specific planned areas.

GOAL 7: Provide adequate open space and recreational areas for the present and future population of Jerusalem Township.

Objective 7A - Encourage developers to provide recreational areas within new residential subdivisions.

Objective 7B - Provide a wide variety of recreation facilities, ranging from tot-lots to playgrounds and play-fields for the young, to passive park areas for older age groups.

Objective 7C - Make full use of the county, state and federal recreational areas as an asset to the Township.

Objective 7D - Preserve the creeks, lakes and woods for desirable recreation pursuits.

Objective 7E - Prohibit recreational activities in areas where they might damage natural systems.

Objective 7F - Establish Open Space and Recreation zoning districts to protect the unique characteristics and qualities of the Township (Authority to establish these zoning districts is given under the Ohio Revised Code enabling statutes, Section 519.02. This type of zoning is not considered to be spot zoning when carried out under a comprehensive land use plan and is related to the general welfare of the Township.)

GOAL 8: To provide for the development of commercial activities related to the recreational nature of Jerusalem Township.

Objective 8A - Develop recreational commercial areas so as to prevent conflicts with other land uses.

Objective 8B - Develop a zoning district to regulate recreational commercial development within the township. (Providing for site plan review, "permitted," "conditional" and "prohibited uses" with the recreational commercial zoning district.)

Objective 8C - Develop recreational commercial districts so they do not infringe upon or adversely effect critical natural areas.

CHAPTER 3

current land use

CHAPTER III

CURRENT LAND USE

A prime factor affecting the environment of a community is the use of land. In order to effectively plan for orderly future development, it is essential to gain an understanding of the existing land uses and their relationship to each other. An inventory of land uses in Waterville Township provides a base from which future land uses can be projected.

SURVEY PROCEDURES

In May, 1979, the Toledo-Lucas County Plan Commissions conducted a land use survey of Waterville Township. This survey was conducted by driving through the Township and recording each land use as it existed (ex. barn, grocery store, house). Data was categorized and mapped, utilizing color codes which identified the various uses. Categories are as follows:

Residential
- Frontage development (single family and trailers)
- Single family subdivisions (frontage and interior street lots)
- Mobile home parks
- Multi-family (apartments)
- Cabins

Commercial
- General Commercial
- Recreational Commercial (campgrounds, marinas)

Industrial
- All industrial buildings
- Extractive (sand pits, quarries)

Institutional
- Schools, churches, government buildings

Open Space
- Public and quasi-public (township land), cemeteries, golf, private recreation, conservation clubs, etc.)
- Waterways (canals, ditches, creeks)
- Parkland, Wildlife Refuge
- Private (wooded, semi-wooded and open space areas, vacant lands)

Agriculture - General agriculture
- Specialized crops (orchards, greenhouses, nurseries)

LAND USE DISTRIBUTION

Jerusalem Township covers an area of approximately 18,793 acres. The following table lists the acreage and percentage distribution of existing land uses.

LAND USE DISTRIBUTION BY ACRES

JERUSALEM TOWNSHIP*

			Acres	%
Residential:	Single family frontage		726.08	
	Single family subdivision		272.31	
	Trailers		4.44	
	Cabins		5.45	
	Multi-family		0	
		Sub Total	1008.28	5.37
Commercial:	General Commercial		41.05	
	Recreational Commercial		86.95	
		Sub Total	128	.68
Industrial:		Sub Total	.86	
Institutional:		Sub Total	168.17	.89
Agricultural:	General agricultural		12679.6	
	Nursery		1.15	
	Greenhouse		4.87	
	Orchards		10.62	
		Sub Total	12696.24	67.55
Open Space:	General Open Space		38.16	
	Woods		272.6	
	Waterways		83.8	
	Vacant Lands		1229.35	
	Parklands		3167.74	
		Sub Total	4791.65	25.49
		Total	18793.20	100%

*Right-of-way included within each category

Source: Current Land Use Map--Jerusalem Township, TLCPC-1979.

EXISTING LAND USE

Residential - Existing residential land uses occupies approximately 1008 acres or 5.37% Jerusalem Township. Of this land 272 acres are within the existing subdivisions of Reno, Bono and Howard Farms, located in the eastern portion of the township. (Note: This acreage includes only that land with housing, not the vacant land within the subdivisions).

The remaining residential is single family frontage lots developed throughout the township on section line roads. The majority of these are of a non-farm nature. They are developed on relatively small acreage lots for rural areas, being built upon lots of irregular size and depth or parcels which have been separated from original farm tracts. All rely on septic tanks and private wells.

This type of residential development can present some of the most serious land use problems that will confront the community in the future. The single family residences have pre-empted a significant portion of the frontage of the Township's major streets. Furthermore, residential driveways exit directly onto busy streets, creating unnecessary and dangerous points of traffic conflict. This uncoordinated growth possess the potential of creating future land development problems. As street frontage is usurped the interior lands become less accessible and are then undesirable for future development.

Finally, this type of residential development is extremely difficult to provide with public services. Protection services are not efficiently utilized because of the distance of residences from fire and police stations. The expense of providing public sewer and water becomes prohibitive

because of the high capital expenditure required to serve relatively few people. For example, a one mile section line road containing 30 homes scattered over its length will require one mile of sewer main. On the other hand, if the same 30 homes were developed in a subdivision with lot widths of 100 feet, only 1,5-0 feet of main would be required. The economies are even greater if residences are clustered or if cul-de-sac streets are used.

Commercial - Approximately 128 acres or .68% of Jerusalem Township is committed to commercial uses. These existing establishments are mainly scattered along Jerusalem Road, and are separated by vacant land or residential dwellings.

Most of the commercial development existing in the Township can be classified as linear, or strip, commercial development. This type of commercial development along major streets can provide serious implications for the future growth of the community. When each establishment occupies a separate lot and has its own curb cuts, parking areas, and advertising signs, safety and economic considerations, as well as aesthetics are involved.

The numerous points of ingress and egress associated with these properties frequently create automobile conflict on the major street. This not only constitutes a hazard, but also interrupts traffic flow and decreases the efficiency of that street. Consequently, the transportation network that has contributed to the vitality of the community can be strangled by commercial expansion if preventive measures are not taken.

This type of commercial development can have the potential or blighting the townscape of the community, and the provision of public services may

become quite costly. An alternative to linear commercial development is the concentration of commercial use in shopping centers or around major intersections.

Industrial - 0.86 acres are listed as industrial in Jerusalem Township. This is the Norfolk and Western Railroad line in the extreme southwest corner of the Township. No other industrial lands exist to date.

Institutional - Institutional uses account for 168.17 or .89% of the land within Jerusalem Township. This category includes schools, churches, township buildings and the City of Oregon filtration plant.

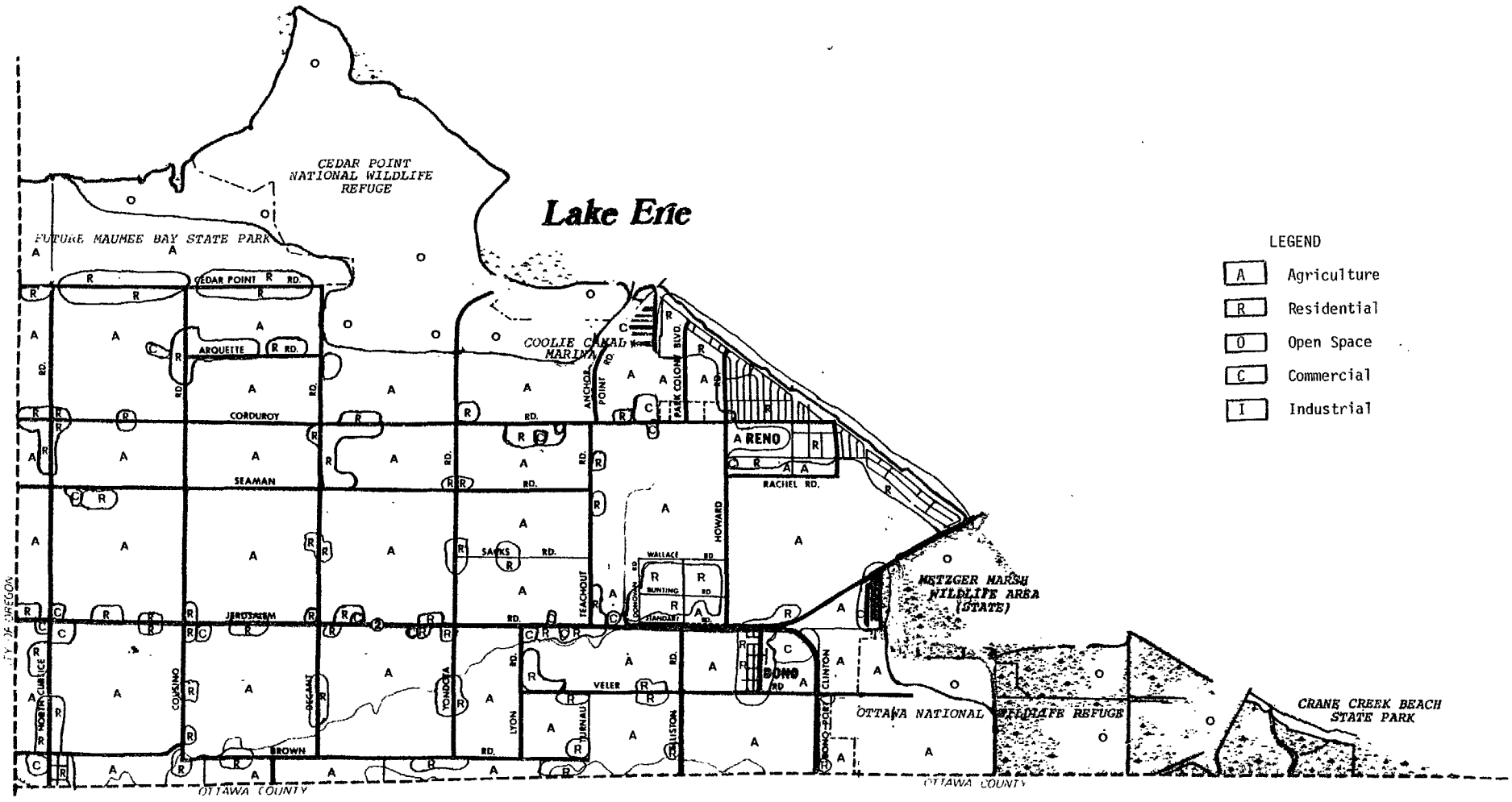
Agricultural - Agriculture represents the largest use of land in the township, 12696.24 acres of 67.55%.

Lucas County has some of the most productive farm lands in the State of Ohio. In 1974, income per acre in the county was $275 as opposed to the State-wide average of $144. But agricultural lands are on the decline; 8.6% or nearly 10,000 productive acres in Ohio were lost between 1969-1974 as determined by the Ohio Crop Reporting Service. These losses are due mainly to incremental conversion of agricultural lands along rural roadways to urban uses, usually residential.

The necessity of extending urban utilities, water, and sewer through active agricultural areas to service leapfrog development is the greatest detriment to the continued vitality of farming. The assessments to a farm property owner for the extension of water, or particularly sewer lines, over long stretches of frontage can be as high as $8,000 an acre. Such assessments for a farmer on his property makes it economically unfeasible for him to continue agriculture activities and the land is put on the market for the

speculative value of urban development. Once urban utilities are available, the tax assessments, based on potential use, may rise as well. Unless programs such as the Current Agriculture Use Value tax of Ohio Farmlands (C.A.U.V. are used by local farmers, pressures for sale and development of agricultural lands will increase if utilities are extended into Jerusalem Township.

Open Space - This category includes vacant/land, parks, waterways and woods which account for the second largest use of land in Jerusalem Township (4791.65 acres or 25.49%). Of this area, 3167.74 acres are included within the State Park and National Wildlife Areas.



JERUSALEM TOWNSHIP

CURRENT LAND USE

0 1/2 1
SCALE MILES

PREPARED BY
TOLEDO-LUCAS COUNTY
PLAN COMMISSIONS

CURRENT ZONING

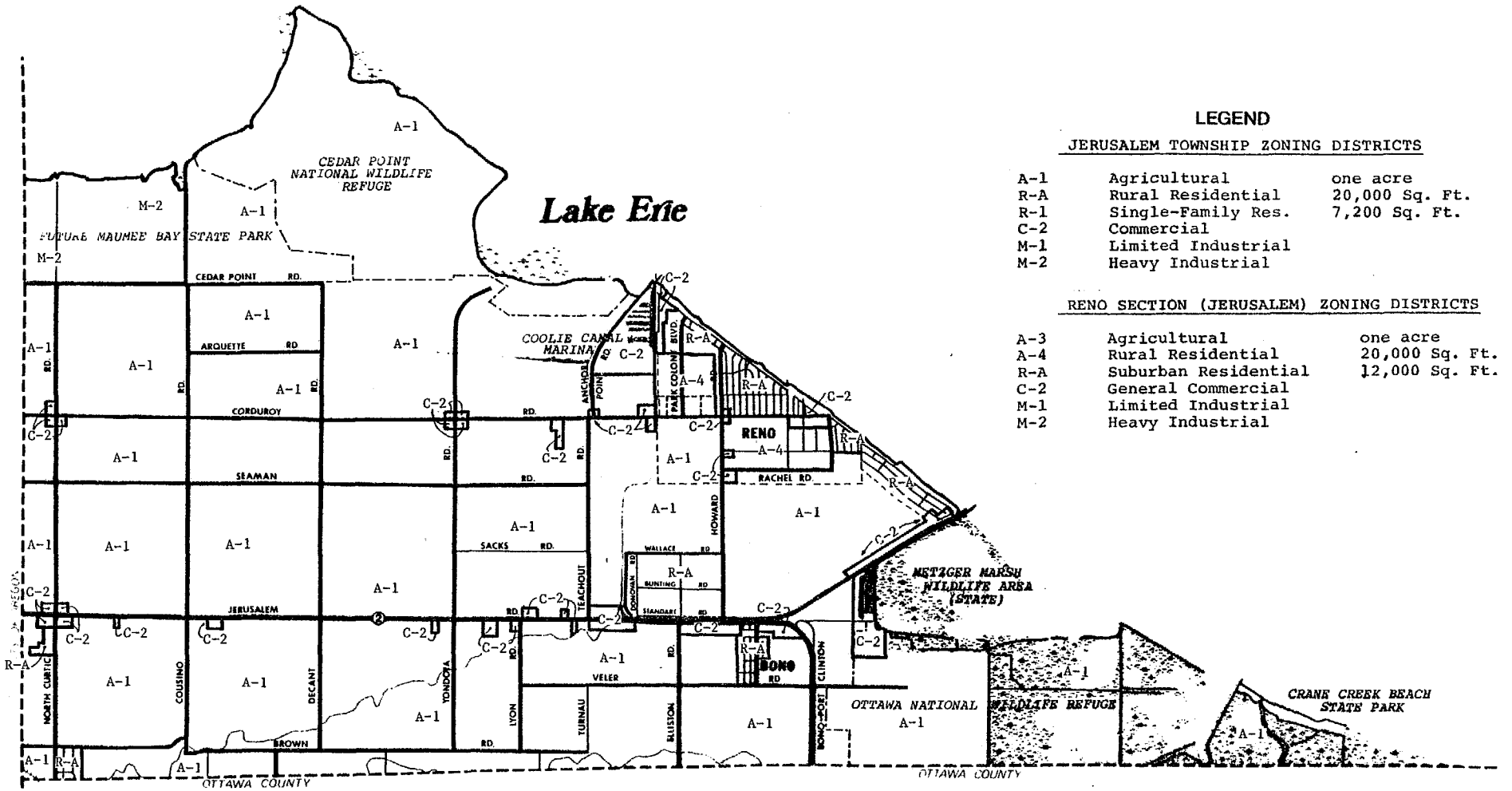
There is present two zoning resolutions for Jerusalem Township, one includes the Reno Beach Area (adopted 1959) and the other the remainder of the township (adopted 1964). Plans are currently underway to revise and combine the two resolutions in 1980.

Below is a summary of the zoning districts and the Uses allowed within each. (For a more complete breakdown see the individual zoning texts.)

ZONE	USES PERMITTED	NET LOT AREA	LOT WIDTH	FRONT YARD	SIDE YARD	REAR YARD
RENO BEACH SECTION						
A-3 (Agricultural)	Agriculture; One-family dwellings; Home Occupations. By permit: Schools, Churches, Parks, Cemetery, Institutions, Radio Stations, Natural resources, Top Soil Stripping. Transitional: Parking	1 acre	125 ft.	Varies, not over 35 ft.	Varies, not over 20 ft.	Varies, not over 25 ft.
A-4 (Rural Residential)	Same as A-3	20,000 sq.ft.	100 ft.	Varies, not over 35 ft.	Varies, not over 10 ft.	Varies, not over 25 ft.
R-A (Suburban Residential)	Same as A-3 plus Transitional: Multi-family dwellings	12,000 sq.ft.	75 ft.	Same as A-4	Same as A-4	Same as A-4
C-2 (General Commercial)	Same as R-A plus Retail Stores; Filling Stations; Offices; Clinics; Parking; Amusements; Wholesale; Shops-No Manufacturing; plus Conditional Uses (See Text)	None except 6,000 sq.ft. if Dwelling	None except 75 ft. if Dwelling	Same as A-3	None except abutting residences	10 ft. minimum

ZONE	USES PERMITTED	NET LOT AREA	LOT WIDTH	FRONT YARD	SIDE YARD	REAR YARD
M-1 (Limited Industrial)	Same as C-2; plus Light Manufacturing; Warehousing; Contractor, Coal or Lumber yards; Truck Terminals; (See Text) (Dwelling Excluded)	None Dwelling not permitted	None	50 ft.	None except abutting residences	25 ft. minimum
M-3 (Heavy Industrial)	Any use (except dwellings) in conformance to Sec. 8-A.	None Dwelling not permitted	None	50 ft.	None except abutting residences	25 ft. minimum
JERUSALEM (EXCLUDING RENO BEACH						
A-1 (Agricultural)	Agriculture One-family Dwelling Roadside stands, Churches, Schools, Parks, Riding Stables, Home Occupations	One Acre	150 ft.	35 ft.	10 ft.	35 ft.
R-A (Rural Residential)	Same as A-1 except Riding stables and roadside stands	20,000 sq.ft.	100 ft.	35 ft.	10 ft.	35 ft.
R-1 (Single-Family Residential)	Same as R-A	7,200 sq.ft.	60 ft.	25 ft.	5 ft. one side, total 13 ft. both sides	25 ft.
C-2 (General Commercial)	Multiple-family Dwellings, retail Stores & businesses Amusement enterprises Auto sales, service Hotel, Motel Offices Wholesale business Kennels Boat facilities, sales, service	None, 36,000 sq.ft. if part used for Dwelling	None	25 ft.	None 15 ft. if ajoins A-1, R-A or R-1	25 ft.
M-1 (Limited Industrial District)	Same as C-2 Nursery, greenhouse Bulk Storage Printing shops, Warehouses Broadcasting Stations & Towers Industrial Plants	None	None	25 ft. 50 ft. Opposite A-1,R-A, R-1	None 15 ft. when adjoining A-1, R-A,R-1	25 ft.

ZONE	USES PERMITTED	NET LOT AREA	LOT WIDTH	FRONT YARD	SIDE YARD	REAR YARD
M-2 (Heavy Industrial)	Same as M-1 Boiler works Metal stamping Manufacturing - glass cement starch paint Grain elevators Conditional Uses: Acid Manufacturing Geletin or glue processing Stockyard	None	None	25 ft. 75 ft. opposite A-1,R-A R-1	Same as M-1	25 ft.



LEGEND

JERUSALEM TOWNSHIP ZONING DISTRICTS

A-1	Agricultural	one acre
R-A	Rural Residential	20,000 Sq. Ft.
R-1	Single-Family Res.	7,200 Sq. Ft.
C-2	Commercial	
M-1	Limited Industrial	
M-2	Heavy Industrial	

RENO SECTION (JERUSALEM) ZONING DISTRICTS

A-3	Agricultural	one acre
A-4	Rural Residential	20,000 Sq. Ft.
R-A	Suburban Residential	12,000 Sq. Ft.
C-2	General Commercial	
M-1	Limited Industrial	
M-2	Heavy Industrial	

JERUSALEM TOWNSHIP

CURRENT ZONING

0 ½ 1
SCALE MILES

PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

2 plate

CHAPTER 4

analysis of existing conditions

METHODOLOGY OF THE JERSUALEM TOWNSHIP LAND USE/IMPACT PLAN

The factors with which the inventory of Jerusalem Township was made were selected as those having the most significant influence over the capability and suitability of the land for development. These permit analysis on a comparative and reasonably objective basis.

The LUAS used for Jerusalem Township was modified to include the following land use categories:

- Agricultural (farm land)
- Residential (single-family homes, subdivisions, multi-family)
- Commercial/Industrial (small scale business)
- Recreational Commercial (marina, campground)
- Open Space (parks, wetlands, vacant land not used for agriculture)

Change were made to reflect the agricultural nature and to address critical issues faced by the Township. Among these are flooding, soil erosion of the coastal zone, a large amount of state and federal wetlands, expansion of the Davis-Besse nuclear power plant, and an increase in recreation related commercial activities.

The Ohio Capability Analysis Program (OCAP) was used to provide the environmental resource data base for the LUAS. The Ohio Capability Analysis Program (OCAP) is a computer information storage

and mapping system developed by the Ohio Department of Natural Resources. The land capability analysis program was initiated in 1973 to provide information to county and regional planning agencies on the physical environment which they can use with their traditional data to make more rational land use decisions.

It enables the user to process and store large quantities of detailed data, to map and update the data rapidly, and to analyze it in a variety of ways.

The overlay capability and the linear weighted model built into the mapping program provide the means for comparing variables and determining development limitations. There are a variety of ways in which the analysis can be done, no one is absolutely correct or free of assumptions but must be adjusted to meet the needs of each individual township. The objective of the analysis is to delimit areas with few development limitations from those with severe limitations. The linear weighted model can evaluate up to 30 variables at a time through a system of weighting the variable and variable levels; the overlay routine is a comparison of two variables only. Files may be created from either procedure and used in further analysis.

The final computer maps that are the result of the digitizing, editing, and analysis of the data do not look like highway maps or other maps with which most people are familiar. The maps are printed with characters similar to those found on a typewriter and have no roads, boundary lines, or town names. Clear overlays, showing

roads, political boundaries or other land marks are provided so that areas can be easily recognized. Numbers located along the edges of the map provide a coordinate system which allows the map user to locate specific areas on the map or to locate the map within a larger state-wide area. (For more detailed information on OCAP, see appendix A.) OCAP maps were used for the following LUAS factors:

FACTOR: Development Limitations

- "Prime Agricultural Lands Map" for Agricultural Land Use.
- "Limitation - Seasonal Recreation Map" (May - November) for Recreational Commercial land use.
- "Limitation on small scale development Map" for Residential Land Use.
- "Limitation on large scale development map" for Commercial/ Industrial land use.
- "Composite Limitation Map" for Open Space land use.

FACTOR: Flood Plain

- OCAP "Flood Plain Map" showing Federal Insurance Administration 100 yr. flood hazard area. Use for all land use categories.

FACTOR: Septic System Suitability

- Use OCAP "Septic Tanks Limitation Map" for all five land use categories.

Information for the following factors was gathered and mapped

by the Toledo-Lucas County Plan Commissions.

- Current Land Use
- Environmental and Sensitive Areas
- Noise
- Visual Amenities and Special Areas
- Access
- Proximity

Each of the nine factors is evaluated as to its influence on the five land uses and given points accordingly. If a factor makes a parcel preferable for a certain land use, three points are given to that parcel. If the factor represents an acceptable or neutral influence of the land, two points are scored. Undesirable characteristics are given one point.

These points are recorded for each parcel by using a transparent grid overlay, with each cell representing an area of nearly 10 acres (10.04 acres). The grid is placed over a township map which shows one of the ten factors (noise, access, etc.). Each cell is then scored and recorded using the horizontal and vertical coordinates of OCAP for location.

The matrix following Page IV-5 arrays the nine factors and the points they received in each of the land use categories. The values given (3, 2, or 1) must be interpreted only as they affect a specific land use. That is, points accrued for a commercial/industrial use, because of a given factor, does not imply that an area is therefore unsuited for a residential or open space use. The LUAS is a positive system in that it suggests how land should be developed rather than what should be avoided.

what should be avoided.

The following section is a description of each of the factors, a discussion of why each one is important in land use allocation, and an explanation of how numerical values are assigned.

CURRENT USE

Any realistic land use analysis must recognize the inertia factor of the current use or development of the land. For example, the soil may be ideal for farming but if a subdivision is already there, farming is no longer the realistic use. The final factors in the pointing system weight the long term land use proposal toward existing land use. Where a change (development) in land use is proposed by the long range plan, it can be fairly confident that the trade-offs are realistic.

Current use was determined through a land use survey of Jerusalem Township conducted in May, 1979. Parks, recreational facilities, commercial and industrial uses were identified as well as residential uses.

Any parcel with an identified use then was considered most capable for that use, except in the case of residential use where only parcels in suburban districts were given most suitable status and rural housing a secondary suitability rating as being less committed to that type of development.

The L.U.A.S. scores current use as follows:

Current Land Use LUAS Points:	3	2	1
Ag.	Ag.	-vacant/ open space	All other uses
Res.	-Res. subdivisions -Institutional	Rural Res.	-vacant/ open space -all other uses
Comm/ Ind.	Comm/Ind.	-vacant land (cell) adjacent to existing comm/ Ind.	-all other uses
Rec. Comm.	Rec. Comm.	-vacant land adjacent to existing rec. comm.	-all other uses
Open Space	-parks -wetlands	-vacant/ open space	All other uses

PROXIMITY

The proximity of land uses one to another and the resulting environment, has been a traditional concern of land use planning. In fact, planning and zoning arose from the need to separate undesirable or nuisance uses from residential areas.

Today, the reasons why and how land uses should be arranged suggest some shift in philosophy from separating uses toward a controlled mixing. Considering these trends, the LUAS rates land according to similar uses within 1/4 or 1/2 mile as the most capable for that same use. Proximity was rated as follows:

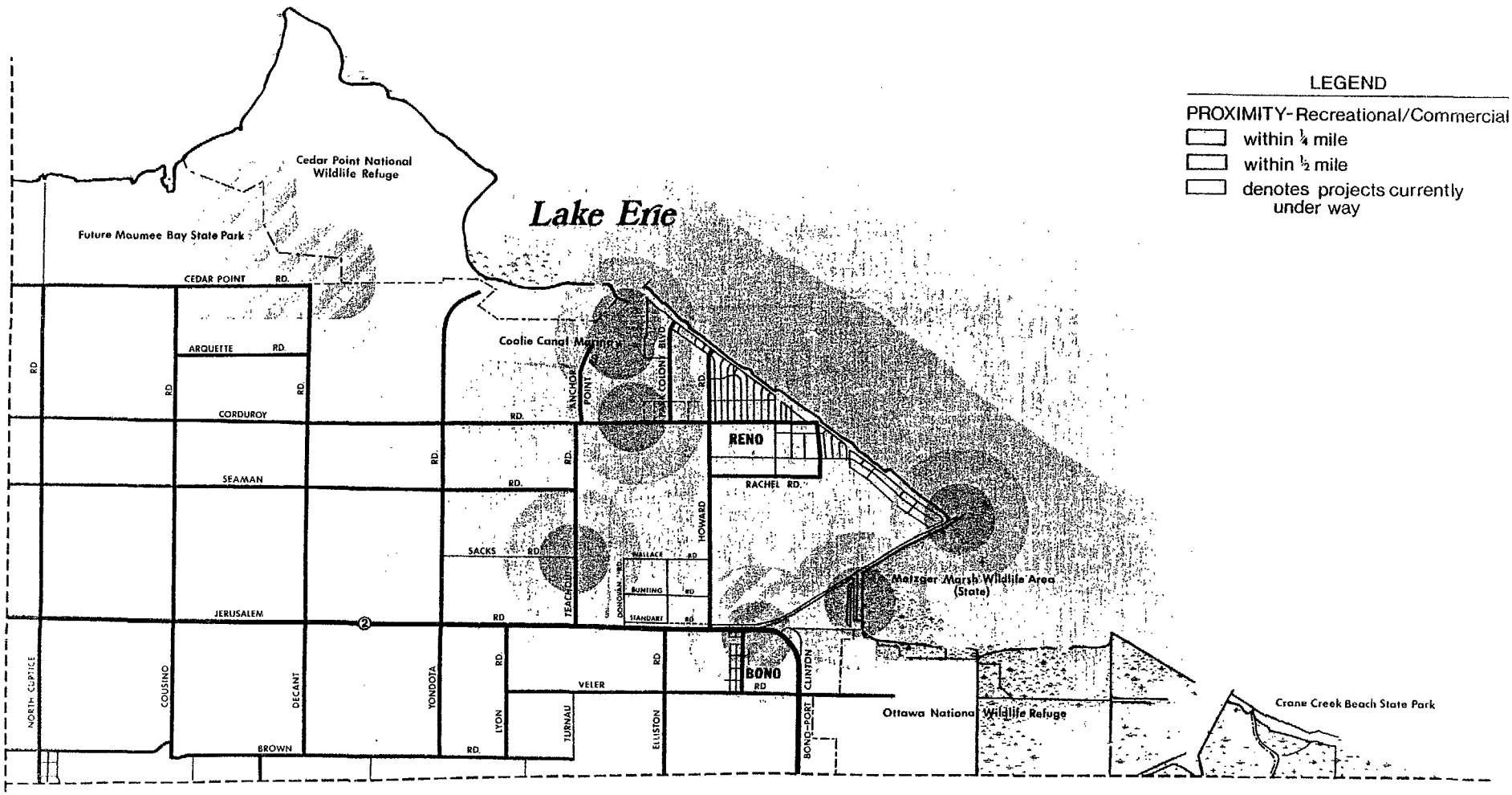
Proximity LUAS Points:	3	2	1
Ag.	--	All cells	--
Res.	Adj. or within	Within 1/2	All other cells
Comm/ Ind.	--	All cells	--
Open Space	--	All cells	--
Rec. Comm.	Adj. or within 1/4 mile	Within 1/2 mile	All other cells

A proximity factor focuses development on current uses expanding from their existing location and is a positive factor to encourage development in adjacent areas. The majority of growth in Jerusalem Township has been

in residential or recreational type commercial (marinas etc.) developments. For this reason proximity was measured from areas of concentrated residential development and recreational commercial sites.

Residential proximity was measured from the centers of the following subdivisions: Reno Beach, Howard Farms Plat Two and Five, and Howard Farms Plat One, as well as from the unincorporated villages of Bono and Curtice.

Recreational commercial proximity was measured from: Anchor Point Marina, Coolie Canal County Park (boat launch and overnight camping), Meinke Marina located on Corduroy Road and Coolie Canal, the proposed Maumee Bay State Park, Wolf Creek Sportsman Club, the proposed campground located on Jerusalem Road (east of Bono), Coolie Canal Marina, Public Boat Launch and the Public Fishing Pier.



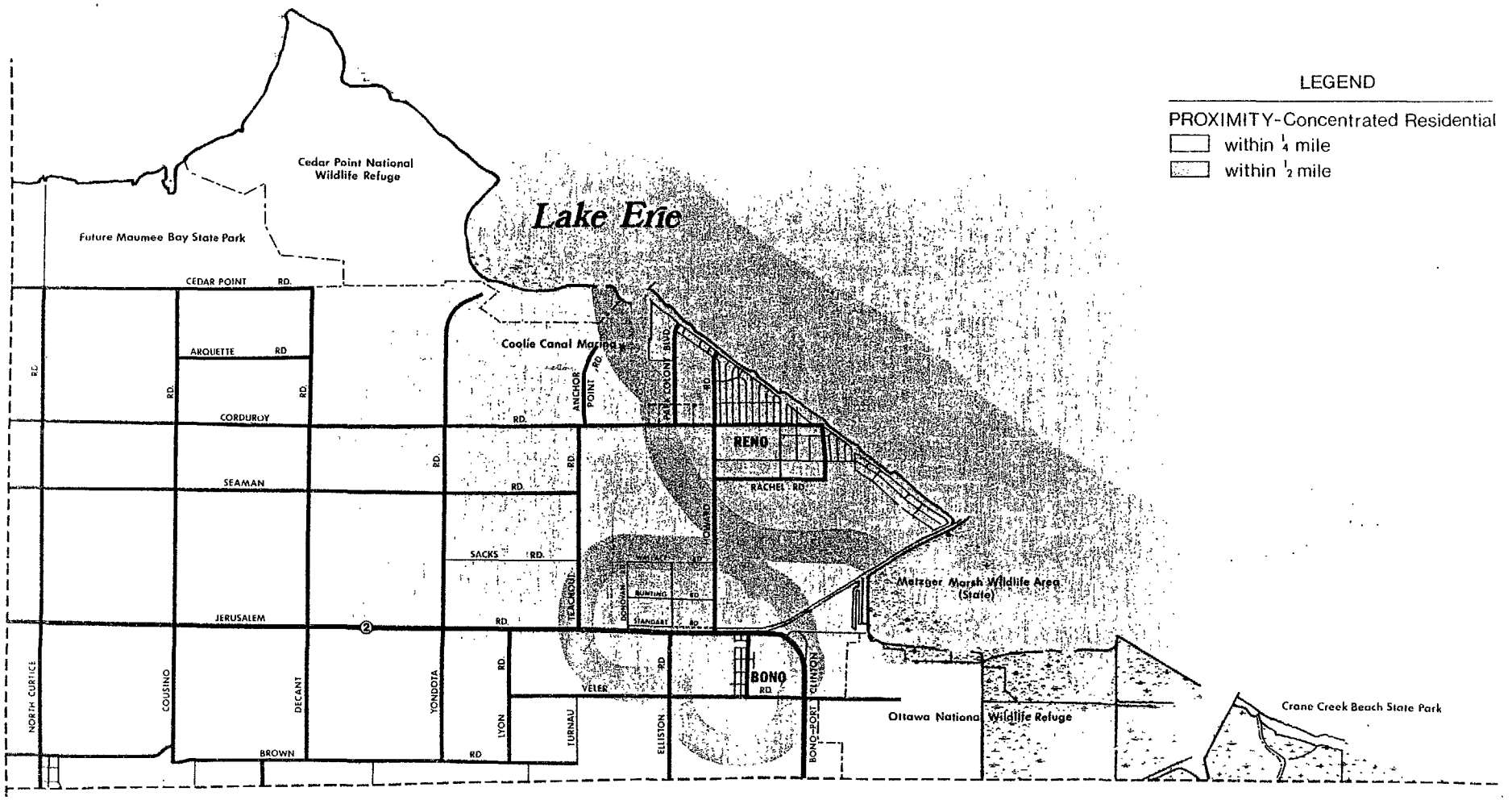
JERUSALEM TOWNSHIP

PROXIMITY Recreational/Commercial

0 ½ 1
SCALE MILES

PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

4 plate



JERUSALEM TOWNSHIP

PROXIMITY-Concentrated Residential

SCALE 0 1/2 1 MILES

PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

3 plate

ACCESS

While access to transportation routes has an affect on all land use, it is of prime concern for commercial and industrial development. The LUAS rates access for industrial and commercial uses, giving these preference on highly accessible sites.

Access is rated for commercial use based on a distance of 1/4 mile from the intersection of minor arterials and principal arterial intersections. Measuring access in terms of intersections and/or interchanges represents an attempt to curb strip commercial development by encouraging commercial uses to cluster in these areas. Ideally, the clustering of commercial facilities will reduce travel time and energy consumption for employees and customers while the stores share streets, water, sewers and lighting.

Industrial use is discouraged from minor arterial and collector intersections because of the streets' limited capacity for traffic and because the nature of development is generally residential. Industrial development is encouraged within one-half mile of a principal arterial route because industrial developments require more space, fewer curb cuts and more all day parking than do commercial developments, making industrial strip developments less detrimental to traffic flow.

With the extensive railway system in Lucas County, railroad access is valuable for industrial development, but only for larger complexes which locate within one-half mile of the line due to costs.

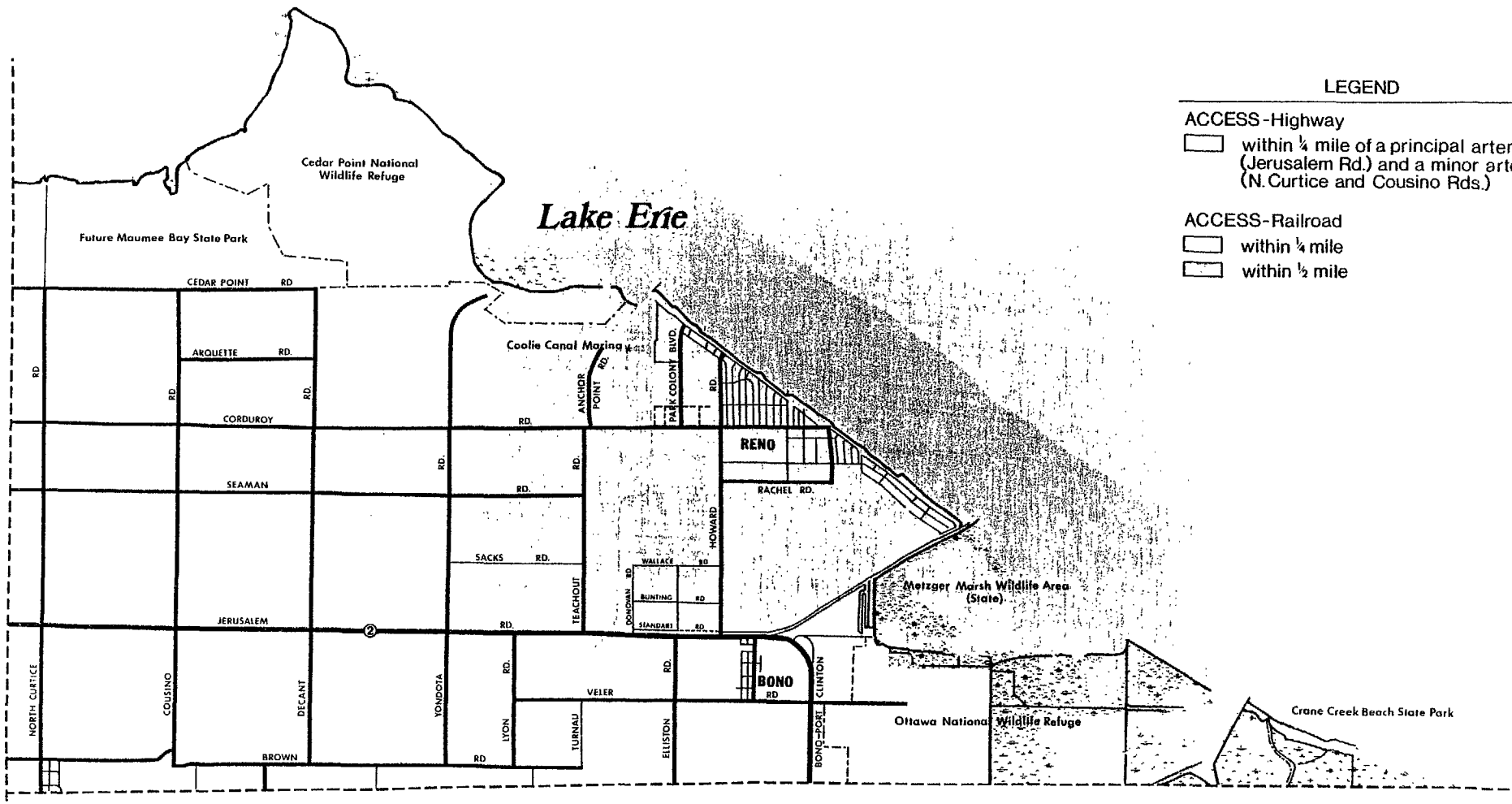
The LUAS distance criteria was adopted from the Urban Land Institute and conversations with the Chamber of Commerce, Toledo Edison and industrial concerns. Preferable points were given to land closest to the access source, and acceptable points, for land further away.

LUAS, ACCESS	A	R	C/I	Rec. Comm.	OS
Within 1/4 mile of a principal and minor arterial intersection	2	1	3	2	2
Outside major access points	2	2	1	2	2
Railroad within 1/4 mile	2	2	3	2	2
Railroad within 1/2 mile	2	2	2	2	2

Jerusalem Road, which provides a link between Toledo and Cleveland, (State Route 2) is the only principal arterial that crosses Jerusalem Township. A principal arterial serves inter-area travel, such as between outlying residential areas and the central city, and between major suburban centers or freeways for access. This corridor is designed for higher speeds, greater volumes, and more truck traffic than most urban or rural streets.

The two minor arterial streets in the township are North Curtice Road and Cousino Road. These roads mainly serve inter-county travel and constitute routes where the predominant travel distance (regardless of traffic volume) are shorter than on the principal arterial. More moderate speeds are typical on these roads. The intersections of these minor arterials and the principal arterial (Jerusalem Road) were the only ones rated for access.

The only railroad that crosses Jerusalem Township is the Norfolk and Western line which runs southwest of Curtice, Ohio. Since only approximately 800 feet of the railroad lies within the township, only the extreme southwest corner is rated for railroad access.



JERUSALEM TOWNSHIP

ACCESS-Highway and Railroad

SCALE 0 ½ 1 MILES

PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

plate 5

NOISE

The level of noise experienced within a given area can have a physical, psychological and even a monetary effect on persons living, working or playing within that area. Studies have shown that hearing loss, nervous tension and even property devaluation can result from certain levels of unwanted sound.*

Several federal agencies currently deal with noise impacts as one of their mandated activities. Among them are the Federal Aviation Administration, the Department of Housing and Urban Development, the Environmental Protection Agency, and Federal Highway Administration. Many of these agencies are passing on their responsibility to local government as it becomes apparent that land use control is the most effective way to achieve a noise compatible environment. It is therefore important that a LUAS consider the amount and location of noise impact areas when assigning land uses.

Moderate and severe noise zones were mapped for each source, according to the U.S. Department of Housing and Urban Development's (HUD) "Noise Assessment Guidelines" published in 1971. The best use for areas within the severely impacted area is either agriculture or industry while to a lesser degree some types of parks would be tenable. The moderate zone, particularly for highway noise, would be acceptable for residential use only if noise barriers were erected, as the noise levels are still considerably above recognized residential standards. Any other use, open space, commercial/industrial, or agriculture would be preferable in the moderate zone.

---

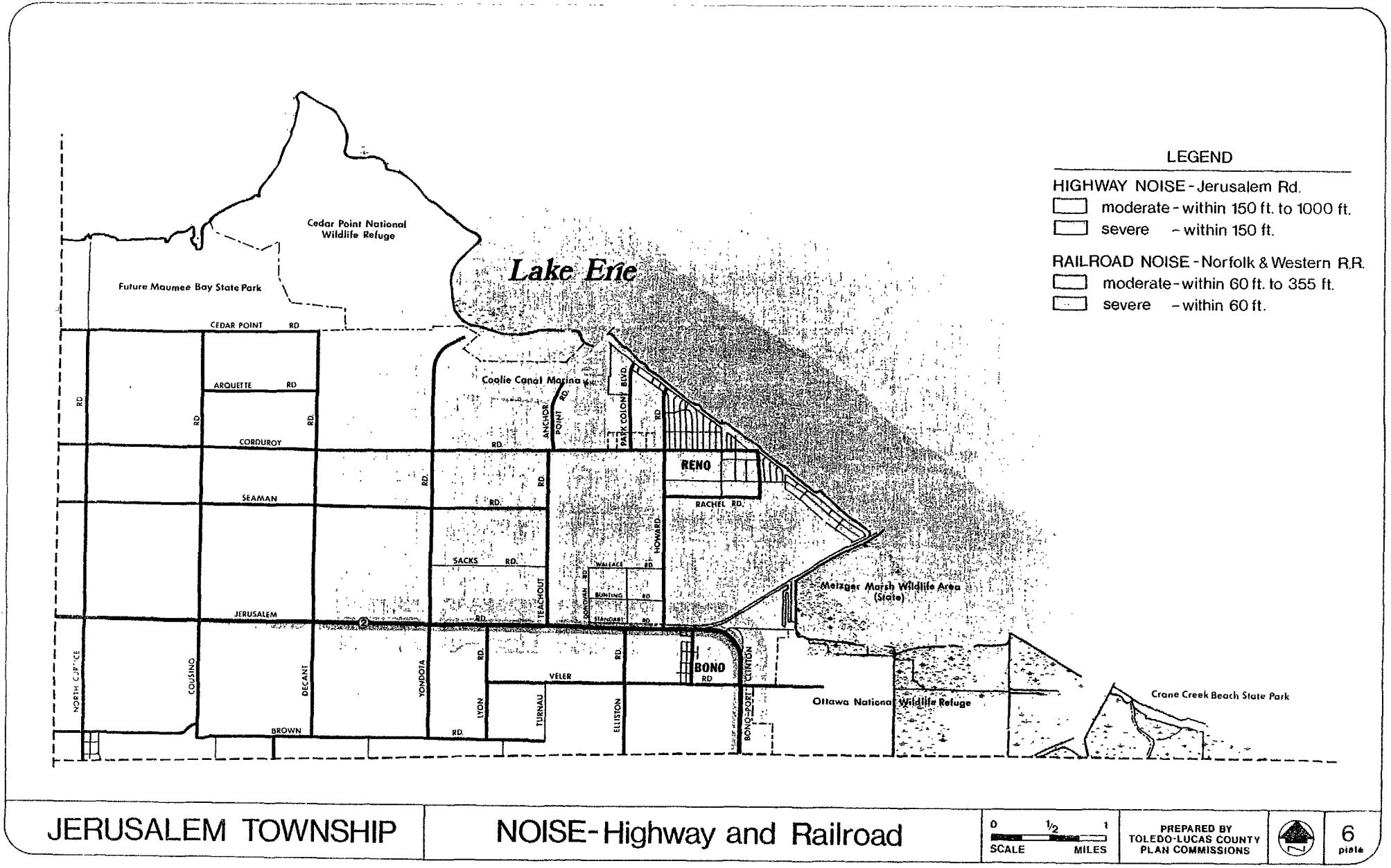
*Land Use, Urban Form, and Environmental Quality, Brian J. L. Berry et al., The University of Chicago Press, Chicago, Illinois, 1974, p. 226-233.

The LUAS evaluates noise levels from four sources (expressways, airports, highways and railways) according to standards established by the Department of Housing and Urban Development. The Norfork and Western Railroad line located southwest of Curtice, and State Route #2 are the two noise source located in Jerusalem Township.

Highway (State Route #2): Roadway noise is estimated based on peak hour travel time, percent of trucks and the designed speed of the roadway. Noise levels are then rated as being slight, moderate or severe, depending on their distance from the source. The LUAS points are assigned to encourage uses that are the least noise sensitive to locate within the impacted areas.

Railways: HUD guidelines for train noise impacts are based on the number of night operations. According to the Norfolk and Western Railroad, their line running southeast through Oregon, Ohio has an average of four trains per night. This puts the noise impact in the middle range, where the severe noise is felt up to 60 feet and the moderate noise range is 60-355 feet. These ratings are based on an area without any line of sight barriers. (For a more complete breakdown on the evaluation of railroad noise see Appendix B

NOISE IMPACT	A	Res.	Comm/Ind.	Rec.Comm.	Open Space
Within 150 ft. of highway	3	1	3	2	2
Within 150-1000 ft. of highway	2	2	2	2	2
Railroad within 60 ft.	3	1	3	2	2
Railroad within 60-355 ft.	2	2	2	2	2
Outside noise areas	2	3	2	2	2



JERUSALEM TOWNSHIP	NOISE - Highway and Railroad	SCALE 0 1/2 1 MILES	PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS	6 plate

SEPTIC SYSTEM SUITABILITY

It is crucial to the concept of this capability study that all possible forces for and against development or conservation of land use be included. Consequently, the future extension of utilities is an important consideration in a long range land use plan. In determining a short range development plan, it would only be necessary to rate utilities as currently provided or scheduled within the planning period.

Open space or parkland development does not necessarily require utilities, nor do farms require irrigation in this part of the country. Consequently, the utilities factor only impacts the capability of land for commercial/industrial, recreational commercial, and residential use. Since the cost of hooking up to public utilities is a restraint on the location of development, areas within 1/2 mile of a trunk line would be ideal for either type of residential or commercial development while an industrial operation might find the cost of connectors acceptable up to a mile.

The western portion of Jerusalem Township is within the City of Oregon water and sewer service area. At the present time there are no plans to extend water or sewer services into the Township until after the year 2000. Consequently, soil suitability for on-site septic systems was considered when looking at potential development areas.

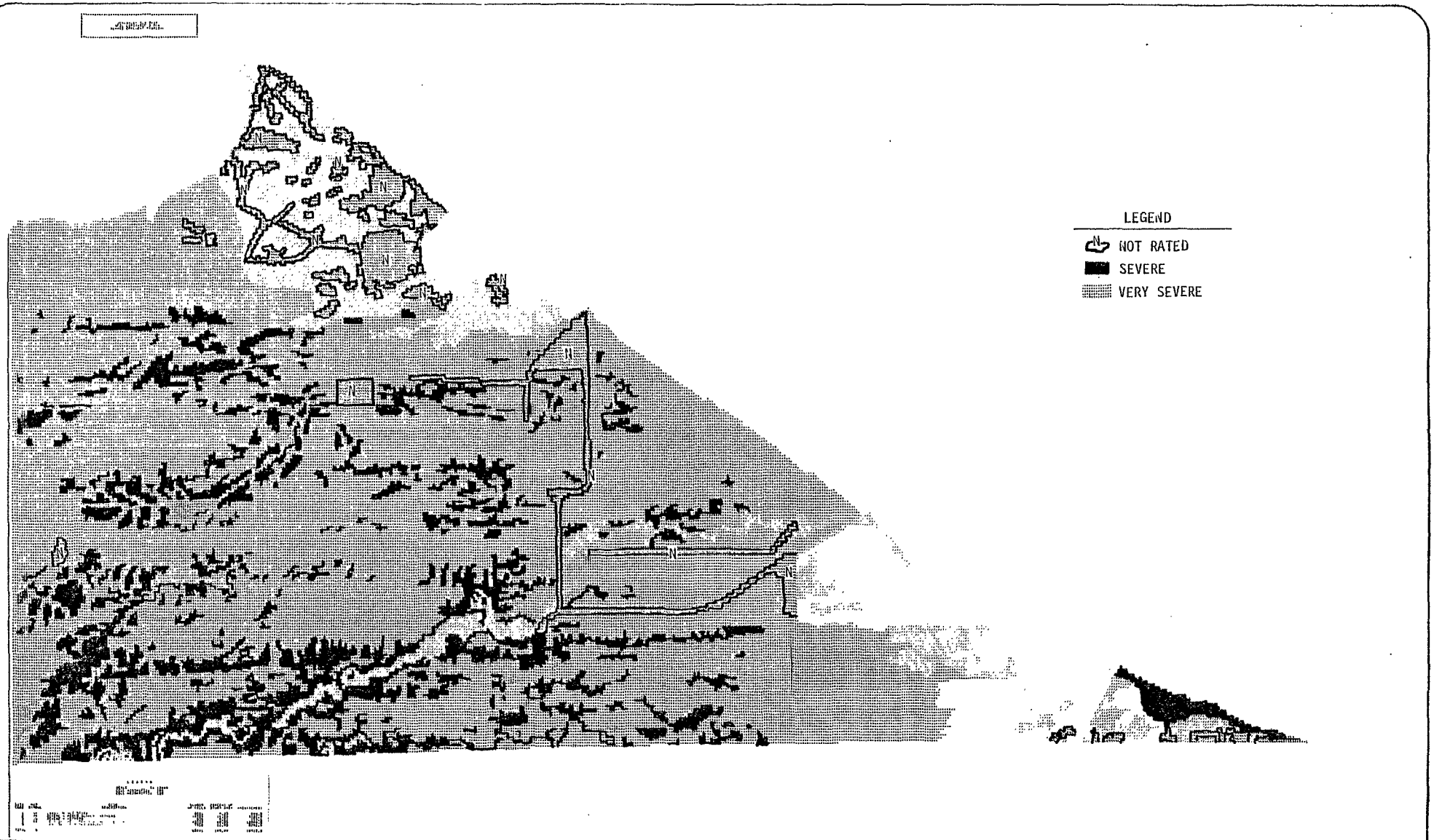
Using the Ohio Capability Analysis Program (OCAP) "Septic Tank" map areas were rated; slight, moderate, severe and very severe. Areas with a slight or moderate rating would be suitable for residential development.

The addition to the slight and moderate categories, areas with severe limitations may also be suitable for the development of commercial,

industrial or recreational commercial facilities. This is due to the fact that commercial and industrial developments can afford the higher construction costs needed to overcome septic problems.

SEPTIC SYSTEM SUITABILITY

LUAS POINTS:	3	2	1
Ag.	--	All cells	--
Res.	No limitation or slight	Moderate	Severe Very severe
Comm/ Ind.	Slight or moderate	Severe	Very severe
Open Space	--	All cells	--
Rec. Comm.	Slight or moderate	Severe	Very severe



JERUSALEM TOWNSHIP

SEPTIC SYSTEM SUITABILITY

SCALE 0 ½ 1 MILES

PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

7 plate

VISUAL AMENITIES AND SPECIAL AREAS

The need to consider natural and man-made areas in land use allocation, provides for this capability factor. Areas that contain Visual Amenities (woodlots, creeks, rivers, canals, Lake Erie) and Special Areas (greenhouses, orchards, nurseries) should be weighted against the other LUAS factors and balanced accordingly.

Visual Amenities provide scenic relief from asphalt and brick, and enhancing the socio-economic qualities of an area is considered as important as encouraging commercial development within easily accessible areas.

Land with a valuable visual amenities on site is preferable for park use since this preserves it for the general public benefit. However, the LUAS recongizes that residential development can occur on land proximate to a visual amenity without destroying it, especially where it would be considered an asset to the development.

As only one of the factors, there is no guarantee that a Visual Amenity or special area will be preserved. However, if two parcels are alike in all respects except that one is the site of a greenhouse, and only one site is needed for development, the parcel without the special feature would be the first choice for development.

Toledo-Lucas County Plan Commissions surveyed and mapped the location of Special Areas (commercial orchards, greenhouses and nurseries). These land uses provide fruit, vegetables, flowers and shrubs for the local market without the high cost of long distance shipping.

Orchards and nurseries are capital which represent a large scale investments either in trees that take years to bear fruit or high cost buildings. Consequently, orchard and nursery operators have usually been unable to relocate in the same area where high land values and taxes have accompanied development.

Special consideration was given to these uses, which service the metropolitan area, and that depends on some guarantees to the continuing profitability of their investments. Since they thrive best in a rural environment, and the possibility of conservation among other developed uses is questionable, parcels containing Special Areas were rated as most suitable for agricultural.

VISUAL AMENITIES AND SPECIAL AREAS

LUAS Pointe	3	2	1
Ag.	SA	All other cells	VA
Res.	VA	All other cells	SA
Comm/ Ind.	--	All other cells	SA VA
Rec. Comm.	VA	All other cells	SA
Open Space	VA	All other cells	SA

Visual Amenities (VA) = Woodlot
Creek, Canals
Lake Erie

Special Areas (SA) = Greenhouses
Orchards
Nurseries

Jerusalem currently contains several greenhouses, orchards and nurseries which are scattered through-out the Township. Waterways that were rated for the LUAS were; Cedar and Crane Creeks; Ward and Coolie (Reno Side Cut) Canals; Wilhelm and Sacks Ditches; along with Lake Erie, which represents the most significant Visual Amenity within Jerusalem Township.

There are also a small number scattered woodlot, of eight acres or less each. This maybe due to the fact that the majority of land is used for agriculture.

ENVIRONMENTAL AND SENSITIVE AREAS

The Environmental and Sensitive Areas factor represent both natural and man-made areas, and includes wetlands, soil erosion recession areas, historic and archeological sites. They are grouped together as one factor because of the need to recognize and preserve the unique and historic qualities of each. It is also important that individuals are aware of problems which may arise by developing in these areas.

While development is not ruled out, it should be closely regulated. Care should be taken to review development impacts against losses of our cultural heritage and natural areas.

The following is an explanation of Environmental and Sensitive areas, why they are significant, and how LUAS points were rated.

ENVIRONMENTAL AND SENSITIVE AREAS

LUAS Points	3	2	1
Ag.	--	All other cells	ESA
Res.	--	All other cells	ESA
Comm/Ind.	--	All other cells	ESA
Rec. Comm.	--	All other cells	ESA
Open Space	ESA	All other cells	--

WETLANDS

A wetlands area includes those areas that are saturated by surface or ground water. The frequency and length of this saturating is sufficient to support vegetation typical of a wetland (cattails, sawgrass, algae).

Wetlands merit protection because of the many useful functions they perform. By preserving the natural drainage these areas help to prevent destructive erosion, and their unique ability to absorb and hold large quantities of water makes them useful for flood barriers and storm protection. They also improve the water quality with the vegetation acting as a natural filter, trapping sediment and removing chemical pollutants.

Wetlands can easily be destroyed by activities both in the wetland itself and in the surrounding area. Direct impact on the wetland may be caused by development within or adjacent to, the wetland area from filling, runoff, draining, flooding, or spraying the wetland for mosquito control. Filling a part of the wetland can be almost as detrimental as filling the entire wetland. Draining the wetland not only destroys the important functions and values of the wetland, but also has a degrading influence on the environment in general. Draining a wetland causes the water table to be lowered locally, water quality to deteriorate, and downstream floods to be more frequent. Additionally, wetland soils are difficult to bring into good agricultural production because they oxidize, are frost pockets, and are subject to flooding in spring and in wet years.

The majority of wetlands lie within existing parks or wildlife areas and account for approximately 2947 acres or 15.7% of the Township.

These areas provide Jerusalem Township with important open space and recreational areas, and are used for fishing, hunting, canoeing, hiking, outdoor education and scientific research.

Wetlands are important in providing wildlife habitats and the vegetative cover which helps to maintain a balanced eco-system. Care should be taken to minimize the destruction, loss or degradation of these areas and to preserve and enhance their natural values. (As governed under Section 404 of the Federal Water Pollution Control Act Amendment of 1972, Public Law 92-500.)

SOIL RECESSION RATES (erosion)

The problems of shoreline erosion is not new to land and home owners along Lake Erie. Since a period of low water in the mid 1960's lake levels have increased steadily and reached a record high in June, 1973 (573.51 feet). The continuation of abnormally high lake levels, along with several severe storms, cause flooding of low-lying areas and a substantial increase in the shoreline soil recession rate (the net loss of shore land through natural processes and resulted in significant property damage and loss of valuable shoreland). Past high lake levels and storms in 1929-30, the mid 1940's and 1952 caused similar situations.

While the problem remain much the same through out the years, increased development of the shore area has drastically magnified the consequences. For this reason, the Ohio Division of Geological Survey (ODNR) in 1970 began a series of county wide studies on shore erosion. The study, "Lake Erie Shore Erosion and Flooding, Lucas County, Ohio, (No. 107)", is a comprehensive investigation of Shoreline recession rates, influences responsible for, and critical areas prone to future erosion.

Shore erosion cannot be related to only one cause, but instead is the result of interaction between several highly varied physical process, such as wave action (wave scour and abrasion, wave impact, wave pressure), weathering (slaking, freeze-thaw), mass wasting (block falls, debris flows) and surface runoff.

It is important to realize the role the lake plays in shore erosion. To assume the lake is directly responsible for all land loss along the shore is faulty. Even without the lake, erosion would occur. Weathering and surface runoff would still cause land loss.

The lake, however, does cause loss principally through wave action. Undercutting of bluffs by wave action increases the likelihood of block falls and rotational slumps. Slaking is propagated by wave action. One of the most significant influences of the lake, however, is not as an agent of erosion but rather as an agent of transport. It is in this role that the lake perpetuates the problem of shore erosion.

Urbanization of shore areas has in many cases had a destructive effect on the shoreline. Man's influence is widespread and in many cases, though intended to preserve the shoreline, actually hastens its destruction. Along the Lucas County shoreline, however, the effects of man, in the form of shoreline protective structures, for the most part have been beneficial.

These structures have two basic orientations-parallel to the shoreline and perpendicular to the shoreline. Parallel structures (seawalls and breakwaters)are intended to protect the shore from the effect of waves by forming an artificial barrier against wave energy. Perpendicular structures (groins, jetties, and piers)act as sediment traps, trapping sand from the littoral system and building a beach to protect the shore.

In general, parallel structures have had a positive effect on the Lucas County shore. In areas where well-designed and well-constructed seawalls were built, erosion has either been stopped or greatly reduced.

Though the effects of parallel structures on adjacent areas is minimal, perpendicular structures can have a significant negative effect on the adjacent shore. By removing material from the littoral system, perpendicular structures deprive downdrift areas of beach-building materials. Even if a jetty or a groin is filled, material is forced to move around its lakeward end, forming a shadow zone downdrift. This shadow zone, which for large structures is estimated to be 5 times greater in length than the protected area, is sediment starved so that beach width is reduced and nearshore water depth increases. This allows greater wave energy to reach the shore and leads to increased shore erosion.

Along the Lake Erie shoreline, where littoral drift is greater, groins have reduced recession measurable. This is especially well illustrated in the Reno Beach-Howard Farms Beach area and at Crane Creek State Park. A well-designed series of groins in an area with an adequate supply of sand can have a positive effect on the shore.

Seawalls have been equally successful along the shoreline. Stone rubble, of sufficient size, placed along the shoreline has proven to be an effective low-cost method of reducing erosion of the shore.

Erosion in many areas can be reduced drastically by effective

conservation procedures including landscaping and improved drainage. Landscaping, particularly in bluff areas, can influence erosion by reducing shear stress. Reduction of both surface runoff and groundwater saturation through proper drainage techniques and planting of adequate ground cover reduces loss through surface runoff and lessens the change of mass wasting.

Structural protection, however, is not without fault. Although structural protection leads to a significant reduction in recession, it offers little protection from flooding unless considerable lengths of shoreline are uniformly protected. Both perpendicular and parallel structures may have detrimental effects on adjacent portions of the shore, perpendicular structures by interrupting littoral drift and parallel structures by increased wave reflection and increased scour in the nearshore zone.

Because of possible adverse effects, permits must be obtained from the U.S. Army, Corps of Engineers and the Ohio Department of Natural Resources before structures can be constructed along the Ohio shoreline of Lake Erie. Monitoring is necessary to prevent construction of poorly designed structures which might be detrimental to the overall shore environment.

Structural protection is also costly in terms of money spent by homeowners for beach retention, upkeep of private protection structures and/or loss of home and property. Taxpayers carry part of the burden when federal relief monies are needed or protection structures are built with federal funding.

Better shoreline management is needed instead of or, in areas where it is economically feasible, in combination with shoreline protection structures. Shoreline management can be an effective tool in solving the problems of both erosion and flooding. Through the Jerusalem Township Land Use/Impact Plan people should be made aware of soil recession areas, and their potential hazards and costs. Development in these areas should be restricted to protect public safety and loss of personal property.

In Jerusalem Township soil recession areas lie within the State Parks and National Wildlife Refuges (see map), and therefore are not the responsibility of the township.

ARCHEOLOGICAL SITES

Archeological sites are a valuable and non-renewable cultural resource that should be taken into account before any developmental or allocation decisions are made. The Ohio Historic Preservation office is currently conducting an inventory of sites within Lucas County and has thus far identified 14 confirmed and 8 unconfirmed archeological sites within Jerusalem Township.

These sites have been identified mainly along Cedar Creek, with two sites located within the proposed Maumee Bay State Park and the remainder scattered throughout the Township. The area along Cedar Creek is where early archaic settlements (5000 - 1000 B.C. took place in this region. While many sites have been identified along the creek, the inventory is not completed and consequently it is advisable to discourage development with 100 yards of the

river bank, or any other archeological sites, in order to protect the fringe areas.

HISTORIC SITES

The National Register of Historic Sites, established in 1935 is a listing of prehistoric and historic properties preserved because of local, state, or national significance. These propertie are protected from adverse impacts caused by state or federally funded and licensed projects. This is done through federal law and the Ohio Revised Code.

Currently, there are no historic sites listed in Jerusalem Township.

FLOOD PLAIN

The LUAS uses the Ohio Capability Analysis Program "Soil Flooding and FIA Flooding" map to identify areas of potential flood hazards. It is important to take flood areas into account when looking at future land developments.

Building in flood-prone areas creates the unnecessary hazard of potential flood damage and loss of life. In addition, as buildings on a floodplain may act as partial dams, they add to the flooding problem by increasing the destructive effects of flooding upstream by raising the level of floodwaters. Since there is no method of preventing floods, emphasis must be placed on preventing development in such flood-prone areas. If flood maps are consulted before a development is begun, or before zoning regulations or land-use plans are formulated, the risk of incurring flood-related losses is greatly reduced. Because of the potential problem, the best use of flood prone areas are open space, recreation or agricultural uses.

Those sections of Jerusalem Township that are shown to be in the "FIA Flood Hazard Boundary Area"* are broken down into the following categories:

No Lake Flooding - not in FIA flood area

Moderate Flooding - within FIA flood area, and has none or only occasional soil problems (ponding due to a high water table problem rather than stream bank overflow).

Severe Flooding - within the FIA flood area, and has the additional problem of frequent soil flooding.

The LUAS recognizes the need to encourage development to locate outside the flood plain. It also recognizes the fact that commercial and industrial concerns may be better able to absorb the increased costs of development

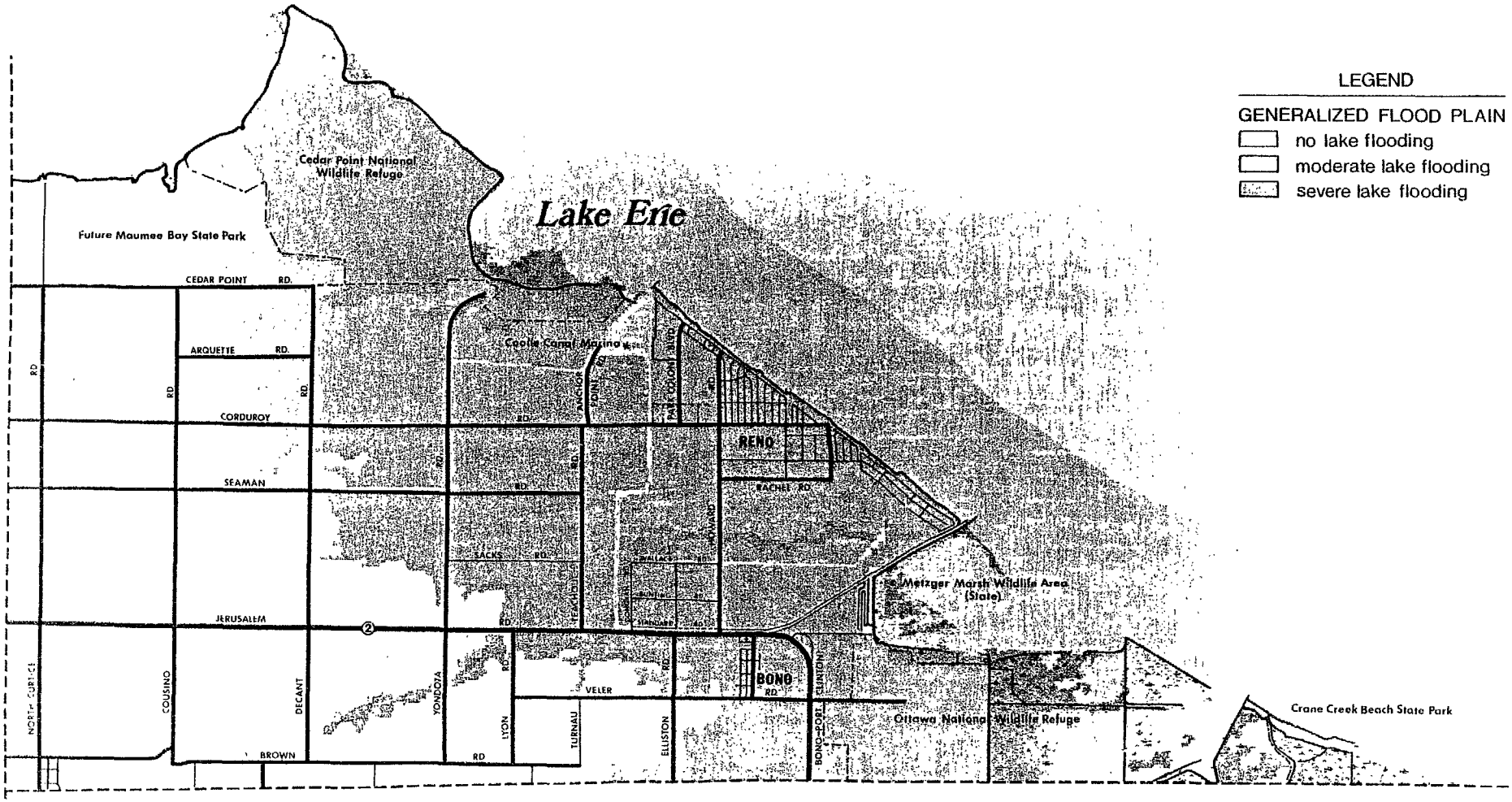
*"Flood Hazard Boundary Map," Dept. of Housing and Urban Development, FIA (Federal Insurance Administration) Effective Date May 20, 1977.

in a flood plain area where there are none, or only occasional, soil flooding problems. FIA flood areas rated severe are not suitable for development due to the additional soil problems, such as drainage, a high water table and the shrink-swell potential.

The LUAS points for each land use is assigned as follows:

Flood Plain LUAS Points:	3	2	1
Agriculture	Mod/severe flood area	Outside	--
Res.	Outside	--	Mod/severe
Comm/Sm. Ind.	Outside	Moderate	Severe
Rec. Comm.	Outside	Moderate	Severe
Open Space	Mod/severe	Outside	--

Of the 66.1 percent of Jerusalem Township that lies within the FIA Flood Hazard Area 50.8% is in the moderate flooding category and 11.1% is rated severe (4.2% of the land area is "not rated", all of which is within the FIA flood area).



JERUSALEM TOWNSHIP

Generalized Flood Plain

SCALE 0 1/2 1 MILES

PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

10 plate

SOIL LIMITATIONS

The ability, or inability, of a soil to support a foundation or to hold vegetation are just two reasons why soil limitations are a significant factor to consider in land use planning. OCAP maps were used for each category (Agriculture, Residential, Commercial/Industrial, Recreational Commercial, Open Space) to evaluate development suitability. The following OCAP maps were used in determining soil limitations:

OCAP "Prime Agricultural Lands Map."

This map was used to determine soils best suited for agricultural use. The listing of prime agricultural soils was provided by the District Conservationist of the Soil Conservation Service in Lucas County. Soil factors* considered in this map were:

1. Erosion Factor "K"
2. Slope
3. Permeability
4. Stoniness

Other factors considered were:

1. Land Use

OCAP "Limitations on Small Scale Development Map."

This map was used to determine soils best suited for residential developments. Factors considered in this map were:

Soil factors considered:

1. Limitations for homesites with basements, including:
   - texture
   - flooding
   - depth to seasonal water table
   - depth to bedrock
   - slope

*For a complete explanation of each soil factor, see Appendix A.

shrink-swell potential
stoniness

2. Limitations for septic systems, including:
   texture
   flooding
   depth to bedrock
   depth to seasonal high water table
   permeability
   slope

Other factors considered:

1. FIA flooding
2. Soil flooding

OCAP "Limitations for Large Scale Development Map."

This map was used to determine soils best suited for commercial and industrial uses. Factors considered in this map were:

Soil factors considered:

1. Limitations for small commercial structures, including:
   (same as homesites above, with more stringent ratings)

Other factors considered:

1. FIA flooding
2. Depth to bedrock

OCAP "Limitations for Seasonal Recreation Map."

This map was used to determine soils best suited for Recreational Commercial Activities. Because of the severe soil wetness problem in Jerusalem Township areas were rated for the period May to November, the drier season. Factors considered were:

Soil factors considered:

1. Susceptibility to flooding
2. Depth and duration of the seasonal high water table
3. Limitations for paths and trails (extensive recreation), including:
   texture
   unified class
   slope
   erosion factor K
   stoniness

4. Limitations for playgrounds (intensive recreation), including:
   - texture
   - stoniness
   - depth to bedrock
   - permeability

OCAP "Composite Limitation Map."

This map was used to determine which soils had the least potential for development and should be left as Open Space. This map was generated by combining the following maps:

- Limitations for seasonal recreation
- Limitations for extensive recreation
- Limitations for intensive recreation
- Limitations for small scale development
- Limitations for large scale development

Using the OCAP maps previously listed, LUAS points were given for each land use category as follows:

LUAS POINTS:	6	4	2
Ag.	Land suitable for Ag.	Marginal Ag. lands (not on OCAP)	All others Not rated areas
Res.	Slight (fewest), mod. limitations	--	Severe Not rated
Comm/ Ind.	Moderate, slight	Severe	Not rated
Open	-not rated areas -very poor -suitable for building w/sewer	Suitable for Ag.	Suitable for -extensive rec. -any building
Rec. Comm.	Slight limitations	Moderate	Severe Not rated areas

CHAPTER 5

energy related impacts

ENERGY RELATED IMPACTS OF THE DAVIS-BESSE NUCLEAR POWER PLANT

Site Description

The total Davis-Besse site area is 954 acres of which 160 acres have been removed from production of grain crops and converted to industrial use. Approximately 600 acres of the area is marshland maintained as a wildlife refuge.

Of the remaining non-marsh area, about 100 acres remain in their original state as woodland and low grassland, and about 230 acres are upland of the farmlands (160 acres). Most of this farmland will be occupied by Station structures, ponds (formed by filling of the borrow pits and quarry), and paved or landscaped areas around and between these features. A small area (about 15 acres), adjacent to Route 2 is farmed by a custodial employee, and a quarter of the crop will be left as food for wildfowl.

The presence of the Station does not affect access to the lake, lakeshore, or surrounding land areas. Prior to acquisition the site area was privately or Federally owned, and the public had no access to the lakeshore. Sand Beach and Long Beach cottage communities are reached by a side road from Route 2, about a mile northwest of the site entrance.

The Davis-Besse site includes a tract known as Navarre Marsh (524 acres). This tract was acquired from the U. S. Bureau of Sport Fisheries and Wildlife, Department of Interior, in exchange for a similar marshland tract of about the same size known as Darby Marsh. Darby Mash is about 5 miles southeast, close to the western limits of the City of Port Clinton. A Memorandum of Understanding was signed on October 4, 1967, and a binding agreement was accepted by the U.S. Government on January 30, 1968. Under the terms of

this agreement the unused portions (totalling 447 acres) of the original Navarre Tract is leased back to the Bureau. A fifty (50) year lease was signed on November 1, 1968.

The remainder of the site was acquired from private owners in 13 parcels between December, 1967 and July, 1970. These acquisitions included 7 residences, and displaced a total of 25 people. A 135-acre marsh area, previously in private ownership, is leased to the Bureau for 25 years. In addition, the Bureau has been given management of another 33 acres of marshland without formal lease. These agreements give the Bureau management of the entire marsh area on the site, with the exception of 24 acres used for the construction of the intake canal.

Under the terms of the agreements with the Bureau, Toledo Edison has agreed to the following to improve the wildlife refuge areas:

1. A dike was constructed through the marsh at the northern edge of the site boundary in late summer of 1971; this season was chosen to avoid interference with nesting and migratory wildfowl. The dike separates the site refuge area from an adjoining private marsh, permitting water level control for improved marsh management.

2. Existing dikes on the Navarre Marsh were in poor repair when the site was acquired; these have been repaired and are maintained. The banks of the intake canal have also been seeded and planted to prevent erosion.

3. Permanent water pumps to control water levels for operation by the Bureau as part of the marsh management program have been installed.

4. Construction workers have been kept out of the marsh areas.

The site includes a drainage canal right-of-way to the Toussaint River near its point of discharge into Lake Erie. In March, 1971, Toledo Edison

purchased the remaining property between the southern site boundary and the river (a total of 188 acres) to prevent further development close to the site boundary and as further protection for the wildlife habitat. This tract is not part of the site proper and is leased to a private concern for wildfowl hunting.

Of the property retained by the Toledo Edison (a total of 339 acres) the graded and fenced Station area, exclusive of the cooling tower, will occupy 56 acres.

Operation of on-site borrow pits, the quarry, and the concrete batch plant have eliminated major sources of heavy truck traffic frequently associated with large construction projects. In cooperation with the Ohio Department of Highways, State Route 2 was widened at the construction road entrance to provide turning and passing lanes, as a means of expediting traffic flow in and out of the site. On-site parking is provided for all construction workers.

IMPACTS OF DAVIS-BESSE

Land Use

Davis-Besse Plant #1 was constructed during the period of 1970 to 1977. During this time the work force was approximately 1,100, with a peak of 1,600 workers during 1973. Since the local region (Toledo, Port Clinton, Fremont, Sandusky) was not able to supply the skilled labor force needed, workers either commuted or moved into the area during the peak construction period.

The construction experience with Unit No. 1 indicates that 60 to 65% of all construction workers were registered with construction unions outside of a 50-mi radius of the station site. Of the permanent staff for Unit No. 1

approximately 10% live in the area, 10% moved in from other areas and 80% commute. A similar pattern is expected for Units No. 2 and 3.

During peak construction for Units No. 2 and 3, the employment statistics are expected to follow the same pattern as Unit No. 1. 2,300 employees are expected to be on the job site during peak construction period of Units 2 and 3. Of this total, assuming the employment patterns will follow those for Unit No. 1, approximately 35%, or 805 employees, will be obtained from construction unions located within a 50-mi radius of the site.

The construction of Units No. 2 and 3 was scheduled to begin at a time when Unit No. 1 would be essentially completed. Thus, the construction of Units No. 2 and 3 would have been a continuation of the construction of Unit No. 1, with the same pool of workers being employed. This construction schedule would have required only about 50% more workers to be added to the already present labor force. Original completion dates for the two additional units were 1988 (No. 2) and 1990 (No. 3). However, Toledo Edison have delayed construction starting dates of Units No. 2 and 3 while studying the feasibility of the additional facilities.To date, no construction permits have been issued.

The Davis-Besse Power Facility I and the potential Facilities II and III have an actual and potential impact upon Jerusalem Township necessitating a Comprehensive Land Use/Impact Plan for the township to respond adequately. The Davis-Besse Nuclear Power facilities influence population influx, employment patterns, demands for public facilities and affect recreational resources.

A major regional power facility such as Davis-Besse has short term employment impact upon Jerusalem Township. The 2,300 construction workers, of

which about 60% pass through Jerusalem Township from Oregon and Toledo, will increase and compound existing traffic problems on State Route 2. This not only affects existing uses along the route, but also poses the potential for commercial development to serve this extensive traffic. Similarly, some of the major power lines from Davis-Besse cross Jerusalem Township, creating some potential for industrial development as well as visual and environmental effects.

Due to Davis-Besse,and potential industrial facilities locating in this area to take advantage of Davis-Besse power and Lake Erie water resources, employment patterns will shift eastward from Toledo into the Oregon port area. This pattern will bring ever increasing pressure in Jerusalem Township for residential and small scale commercial developments.

The movement of population through the Township on State Route 2 and the potential new residence will create new demands on public facilities and services, such as public sewer and water from Oregon, road improvements, police, and schools.

Total permanent employment for Facilities 1, 2 and 3 will be approximately 600 workers. Jerusalem Township offers a rural atmosphere to live mid-way between work, Toledo, and recreational facilities. The township has traditionally been a rural area, heavily farmed and strongly influenced by its lakeshore location. There has been a moderate increase in general development, primarily residential activity in Jerusalem in the past five years, and the further power plant development will have some impact in continuing and increasing this development.

Jerusalem Township is a valuable, but fragile environmental area. Within the Township are areas designated as "areas of particular concern" (i.e.

coastal zone areas, a national wildlife refuge, marshland, and part of a new proposed state park). About one-half of the Township is within the 100-year flood plain. This area and a large part of the rest of the Township has a high seasonal water table. Other problems include shoreland erosion and difficulties of on-site sanitary disposal and an adequate water supply, due to soil conditions. Thus, while an average of 12 new residential units per year (1970-1978) will not normally cause problems, any new development, whether industrial, commercial or residential, has a significant input on the Township environment. The potential for environment pollution from package treatment plants and septic tanks is great. Using land capability studies can help to identify the amount and allocation of growth possible within the Township. The Land Use Plan then sets policies and suitable areas to handle these uses.

JERUSALEM TOWNSHIP
NUMBER OF DWELLING UNITS

Year	No. D.U's	Difference	% Change
1960 (Census)	1176	---	---
1970 (Census)	1018	-156	-1.3%
1970	1025	+7	.69%
1971	1034	+9	.88%
1972	1060	+26	2.51%
1973	1081	+21	1.98%
1974	1086	+5	.46%
1975	1093	+7	.64%
1976	1101	+8	.73%
1977	1118	+17	1.54%
1978	1134	+16	1.43%

Note: While some residential development can be attributed to natural growth the major increase occurred in 1972 and 1973, the time of peak employment at Davis-Besse.

AQUATIC ENVIRONMENT

The major environmental impacts on the aquatic ecosystem are the mechanical, thermal and chemical effects resulting from the intake of water from Lake Erie, passage through the Station, and discharge back into the lake.

Intake

The water intake crib is about 3,000 feet from shore in 11-15 feet of water (depending on lake level). Since the vertical downflow through the slots in the intake crib will be a maximum of 0.5 feet/second, entrainment of fish has been reduced. Experience at the Indian Point Power Plant on the Hudson River indicates that the number of entrained small fish remains relatively constant at intake velocities up to about 1.0 feet/second, at which point the number increased greatly. Adult fish should be able to avoid being drawn into the intake, although young fish or weak adults swimming too near the intake will probably be entrained. Trawling catches of young-of-the-year near Crane Creek (6 miles northwest of the station) indicate that gizzard shad, alewife, drum, white bass and shiners are likely to be the most abundant young fish near the intake crib. Most fish that are entrained in the intake water will be impinged on the traveling screens located in the intake structure at the end of the intake canal.

Station Passage

Planktonic organisms contained in the intake water, fish fry and eggs small enough to pass the 1/4-inch openings in the traveling screens will be subjected to mechanical, thermal and chemical damage during passage through the Station. On the average an organism will spend about 20 hours in the Station, during which time it will go through periods of chlorination (which alone will probably cause 100% mortality) and several trips through condensers and pumps where it will be subjected to mechanical

abrasion and thermal shock. It is estimated that the probability of an organism leaving the cooling tower circulating water system after only one pass is only 2%. Therefore, practically every organism entrained in the intake water is killed.

Discharge

Water from the Station's collecting basin will be discharged into Lake Erie. This water will generally be warmer than Lake Erie (except for a few days in the fall when it will probably be a few degrees cooler) and will contain the same dissolved solids as normal in Lake Erie water, but at approximately twice the concentrations. Dissolved oxygen concentrations will be near lake levels.

Approximately one half acre of the bottom near the discharge in Lake Erie will be covered with riprap and the benthic community in the area will be altered. There should be no increase in turbidity.

The Station's liquid effluents are discharged from a submerged jet at a maximum exit velocity of 6.5 feet/sec to promote rapid mixing and dilution. Since the lake bottom for about 200 feet downstream of the exit is lined with rockfill, scouring of the sandy bottom with attendant turbidity during normal operation is not expected. However, there will probably be some turbidity for short periods after start up, due to materials which have settled in front of the discharge during shut down.

Thermal

Approximately 98% of the waste heat produced by the Station is discharged to the atmosphere via the cooling tower. The remaining 2% is discharged to Lake Erie with the cooling tower blowdown. The resulting maximum heat

load to the lake is 138 million BUT/hr (13,800 gpm at a temperature 20°F above ambient lake temperature). The maximum load will occur during April. (See Table below).

Temperature Difference between
Station Cooling Tower Blowdown Water
and Ambient Lake (°F)

	Minimum	Average	Maximum
January	-3	11.2	29
February	3	17.0	25
March	9	16.0	23
April	10	19.1	30
May	5	15.0	23
June	3	14.0	22
July	6	12.1	20
August	5	10.0	14
September	-5	5.0	14
October	6	17.0	23
November	7	17.1	30
December	8	18.2	30

Atmospheric wet-bulk temperatures (taken at the on-site meterology tower) were used to determine the cooling tower blowdown temperatures. The lake water temperatures were subtracted to obtain these numbers.

Source: "Final Environmental Statement related to Construction of Davis-Besse Nuclear Power Station," U.S. Atomic Energy Commission, March, 1973.

The cooling tower blowdown and service water which the Station discharges to Lake Erie, via a submerged jet, will be heated no more than 20°F above the ambient lake water temperature. Although some small fish and plankton in the discharge water plume will be disabled as a result of thermal shock and exposure to chlorine and buffeting, few adult fish will be affected. The thermal plume resulting from the maximum thermal discharge is

calculated to have an area of less than one acre within the $3^{o}F$ isotherm (above lake ambient).

The elevated temperatures in the $3^{o}F$ isotherm could increase production and shift the species composition to a predominance of blue-green algae earlier in the year. The filamentous blue-green alga Alphanizomenon flosaque, common at the Davis-Besse site, could produce a nuisance water bloom. However, the localized area and short residence time of algae in the thermal plume preclude an extensive nuisance bloom of algae caused by the increased water temperature.

AVIAN ENRIONMENT

The site is within a flyway for migratory birds, songbirds as well as waterfowl. The cooling tower and transmission lines are potential obstructions to migrating birds, who might be killed or wounded by flying into these structures when they are forced by adverse weather to fly under low clouds. Major kills (several thousand in one night) are generally associated with peak periods of migrations (particularly in the fall, when total numbers of migrating birds are much larger than in the spring), where the birds started migrating under favorable weather conditions with good tail winds, then encountered a weather front with low, deep cloud cover, possibly with fog or mist, and were forced to fly low. Navigational lights on tall (generally about 1000 feet) towers apparently attract the birds who become confused and fly into the ground, buildings, or tower guy wires. Small losses can occur intermittently during peak periods of migration, even on clear nights with good visibility.

The structures present on the Davis-Besse site, because of their size (cooling tower, 495 ft. high; shield building, 240 ft. high; and meteor-

ological tower, 300 ft. high), are a cause of bird mortality during nocturnal migration. Because of the sites proximity to two important migration lanes, the number of bird kills may be higher than would normally be expected. One migration lane runs from Point Pelee, Ontario, south across the Lake Erie Islands to Marblehead and Cedar Point, Ohio. This lane is used by migrating birds during both spring and fall migrations. The Perry International Peace Monument located in this lane at Put-In-Bay, South Bass Island, has also been responsible for bird kills during spring migration.

The site is also located within a second migration lane, which runs along the Lake Erie shoreline from Sandusky to Toledo. This lane is probably used most extensively during spring migration when northward migrating birds encounter Lake Erie and are diverted westward along the lakeshore.

Observations of bird mortality that result from structure impacts were begun in the fall of 1972 to cover the period of migration and continued in the spring and fall periods of 1973, and the spring of 1974. Over the period of observations, 334 bird kills were directly attributed to collision with unit structures. The species found in the three periods were predominantly warblers, kinglets, and fringillids (sparrows, finches, and buntings). It has been observed at the Davis-Besse site that waterfowl and other large birds generally avoid the site structures. With the exception of a ring-billed gull, no evidence of their collision was found.

Transmission lines have horizontal wires, but they are much lower than the other structures on the site. Therefore, major kills of nocturnal migrants are not expected to occur. Occasional mortalities may occur, but these are not expected to be significant compared to the numbers that die from other migrational hazards.

The transmission lines are not expecred to be an electrical hazard to birds. Studies of bird electrocutions on power lines indicate that the lower voltage distribution lines (under 60 kV, particularly the three-phase, 4-carrier lines with spacing less than 6 feet between the phase conductors and ground wire), are the lines involved in bird electrocutions, not the higher voltage transmission lines, such as those located on the Davis-Besse site.

ATMOSPHERIC EMISSIONS

The operation of the facility will not produce any non-radioactive gaseous or particulate emissions that could constitute a hazard to the health and safety of on-site or off-site populations. The only emission of exhaust gases as a consequence of normal operation will occur during the periodic operation of auxiliary boiler units. These units will be fired by No. 2 fuel oil and will be of such a size that they will not constitute a significant source of atmospheric emissions. The emissions, when they do occur during limited operating periods, will not exceed any applicable emission standard (federal, state, or local) for new sources. The significant applicable regulations cover the pounds per hour emitted and the maximum 1-hour ground level ambient air concentration. The impact of the intermittent operation of the boilers is insignificant when longer term averaging periods are used to evaluate the ambient air quality. The emissions generated by the operation of Units No. 2 and 3 will be such that no specific emission control equipment will be needed. Therefore, there will be no risk of increased emissions due to emission control equipment failures.

The emission of water vapor from the proposed cooling towers will, on

occasion, produce a visible plume. The plume forms from the condensation of water evaporated from the towers. The hyperbolic, natural draft cooling towers will be approximately 500 ft. tall, with a throat diameter of approximately 250 ft. Under the average climatic conditions conducive to the formation of a plume, the plume will extend for a distance of 1.5 miles downwind.

Ground level effects of fog or vapors due to emission from the cooling towers are considered negligible, with less than a 0.5% increase in fog conditions. This does not mean more foggy days but an earlier onset and a later termination of natural fog than would occur if there were no emissions from the cooling towers.

Under a particular set of meteorological conditions the plume from the cooling towers can be trapped in the wake formed by the wind blowing around the towers. Under these conditions, the plume may be carried down to the ground. If ambient temperatures are below freezing, the plume may deposit material that may freeze. It is predicted that this condition will exist for no more than a total of 17 hr. during the winter season.

The natural draft towers will allow the emission of 72,056 lb. of water in the form of droplets into the atmosphere each hour. Less than 1% of this amount will be deposited on the ground outside the site boundaries.

The off-site occurrence of fog, mist, and icing due to cooling tower effluents will not have any substantial effect on any transportation route or facility. State Route 2 is the closest highway that could be affected by the fogging and icing due to the operation of natural draft cooling towers at the Davis-Besse site. However, the maximum frequency of reduced visibility to 1,000 m or less over Route 2 is predicted to be only 3 hours per year.

CHAPTER 6

non-energy related impacts

CHAPTER VI

NON-ENERGY RELATED IMPACTS

The greatest non-energy impact on Jerusalem Township are the large government (federal, state, county) land holdings, in the form of parks and wildlife refuges. These areas take up approximately 6227 acres or 33% of the township and are:

Cedar Point National Wildlife Refuge	2245 acres
Coolie Canal County Marina and Park	20.3 acres
Crane Creek State Park	79.2 acres
Magee Marsh	105.6
Maumee Bay State Park	
Currently under State ownership	480.61 acres
To be acquired	660.42
State Park Total	1141.23
Metzger Marsh	558 acres
Ottawa National Wildlife Refuge	2078 acres in Lucas County
Total	6227.33

Public land ownership can take valuable agricultural lands out of production and reduce taxable resources. It should be noted, however, that the government lands are for the most part wetland areas and create additional recreational opportunities in Jerusalem Township.

Crane Creek State Park occupies a 2.5 mile stretch of lakeshore adjacent to Magee Marsh, in the eastern tip of Jerusalem Township. This 72 acre site is a popular picnicking, swimming and fishing area. It is estimated that there are about 125,000 yearly visitors, with an average daily attendance of 2,500.

Magee and Metzger Marsh State Wildlife Areas are located in a prime waterfowl area. Magee Marsh is established as a wildlife experiment station and serves as headquarters for wildlife waterfowl research. Metzger Marsh offers a boat launching ramp which provides boaters with protected access, via Wards Canal, to Lake Erie and a fishing pier located at the mouth of the canal. The public is admitted to these wildlife areas for fishing, nature study and controlled hunting in season.

Coolie Canal Marina and Park is a county-owned facility which offers overnight camping and a boat launch area.

Cedar Point and Ottawa National Wildlife Refuges are operated by the U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife. They are managed solely for the conservation of wildlife, with special emphasis on migratory wildfowl. The only public access is for use of existing nature trails.

Maumee Bay State Park, when completed, will have by far the greatest impact on Jerusalem Township, with an expected annual park attendance of:

Stage 1 - Campground facility scheduled opening - 1980
Projected attendance - 80,000

Stage 2 - Beach and picnic area scheduled opening - 1981
Projected attendance - 828,800

Stage 3 - Lodge and cabin area scheduled opening - 1984
Projected attendance - 1,000,000

The peak hours of travel is expected at 4 to 5 p.m. on weekdays and 11 a.m. to noon on Sundays. This peak will create its own demand for convenience food carry-out facilities and restaurants. This demand will begin in Stage 1 (Campground Facilities, 250 sites), due to open in 1980, and will greatly increase in Stage 2 when the Beach and Picnic area opens. A small increase

in demand would be seen with the addition of the lodge and cabins. Thus, the proposed park will have the greatest land use impact on these kinds of food services.

A small demand increase may result for traffic going towards the east on S.R. 2. Therefore, a gas station may appear at the N. Curtice Road and S.R. 2 intersection. Also possible at this location, is a combination carry-out and gas station. There are sufficient gas stations to the west of S.R. 2.

Perhaps the hardest to predict is boating demand, since ODNR, at present, is not proposing a boat launch and marina. However, it is safe to predict that campers who bring boats will use the nearby facilities, such as Anchor Point Marina, Lucas County Marina and Coolie Canal Marina, all off of Corduroy Road. Also, several miles further to the east, off of S.R. 2 is a State of Ohio Marina and Robo Marina.

Besides demand for more boat launches, there will also be an increased demand for boat storage and service facilities. Unless these facilities are part of a marina, they seek lower priced land and probably would not be able to afford land prices along S.R. 2, locating instead on side roads. Thus, the demand on the boat storage and service facilities such as Anchor Point Marina would increase. At some point in the future, boat storage buildings could appear on Cedar Point Road, N. Curtice Road, or more likely, on Corduroy Road. Corduroy Road to the east is a direct route from Maumee Bay State Park to the Anchor Point Marina area, and has several boat related commercial uses already existing there.

With Oregon and Toledo a few miles away, most demand for entertainment facilities can be accommodated by existing establishments. The exception would be establishments for teenagers, and perhaps bars and niteclubs. The problem of activities for teenagers under 16, or for those without access to a car, is of particular concern since any land use impact would be within walking distance of the park. Uses which would cater to teenagers would be putt-putt courses and penny arcades. Possible locations for these uses would be Cedar Point Road between Stadium Road and N. Curtice Road or on Bay Shore Road.

The development of private campgrounds is a likely impact, since there is a location advantage of spillover from other camp grounds which may be full. Camp grounds tend to locate near some natural features. Since the lake frontage is now in either developed in older subdivisions, or is in government ownership, the likely site locations would be wooded. There are two woods just to the south of the State Park, and one to the west. However, if the demand is great enough, especially after the beach is opened in 1981, open field camp sites are possible.

At this time it is not foreseen that the Maumee Bay State Park will encourage second home subdivisions or mobile home park developments. The current lack of infrastructures (public sewer and water) will preclude any large scale or high density development in the township.

To develop the land use controls needed to regulate future park related development and mitigate any detrimental impacts, the following are recommended:

1. Develop within the park a State operated commissary for campers to reduce the need for vehicle trips from the park during a camper's stay.

2. Encourage local government to strengthen land use controls to prevent detrimental, marginal development and provide effective zoning.

3. As part of the lodge facility, provide an area for teenagers with pin-ball machines, etc.

CHAPTER 7

citizen participation

CITIZEN PARTICIPATION

Work on the Jerusalem Township Land Use/Impact Plan began in January, 1979, under a Coastal Energy Impact Program Grant 308 (c) from the Ohio Department of Energy. Committees involved in the planning and review process were: The Lucas County Planning Commissioners, Jerusalem Township Trustees, Jerusalem Township Zoning Board, various local interest groups, (among these the Jerusalem Township Civic and Improvement League, and the various democrat clubs). Meetings held with these groups include:

January 12, 1979 - Jerusalem Township Trustees and Zoning Board

January 29, 1979 - Jerusalem Township Trustees and Zoning Board

February 12, 1979 - Jerusalem Township Trustees

August 20, 1979 - Jerusalem Township Trustees and Zoning Board

September 10, 1979 - Jerusalem Township Trustees and Zoning Board

October 4, 1979 - Jerusalem Township Trustees and Zoning Board, citizen groups, and residents.

November 19, 1979 - Jerusalem Township Trustees and Zoning Board

December 20, 1979 - Jerusalem Township Trustees and Zoning Board

January 3, 1980 - Jerusalem Township Trustees and Zoning Board, citizen groups, residents, and OCAP/ODNR.

The purpose of the meetings was to explain the planning process (how Jerusalem Township relates to county-wide planning, the role of elected officials and citizens), and combined Land Use Allocation and Ohio Capability Analysis (LUAS/OCAP) criteria and scoring system, and to present a preliminary land use allocation map for discussion.

The LUAS/OCAP criteria, scoring systems, and maps were reviewed and found acceptable by all groups. These then formed the basis on which the land use plan was developed.

It should be noted that while many of the meetings held were with the Jerusalem Trustees and Zoning Board, all the meetings were open to the public and representatives of the various citizen groups were invited. For additional information on meetings see Appendix C.

CHAPTER 8

plan development

SUMMARY LAND USE

After the points for the factors have been recorded, they are totalled for each grid cell. The maximum number of points any one grid cell could accrue in each category is: 26 for agricultural use, 28 for residential, 26 for commercial/industrial, 26 for recreational commercial, and 27 for open space (this represents the number received in each category when the highest score is given for the nine factors).

The Summary Land Uses are determined by the land use receiving the highest score. However, the designation of a parcel is preferable for a specific use should not be interpreted to mean that only that use is acceptable and all other uses are unacceptable. The intention of the LUAS is to present a ranking of uses based on their comparison. It does not indicate what uses are unacceptable for a given parcel; only which use is preferable as compared to the other four. So when a parcel is given a summary use of agricultural, it is not to be inferred that residential or park uses would be unacceptable. Any or all of the other uses may or may not be acceptable.

OVERRIDING FACTORS

The Land Use Allocation System provides a foundation on which to evaluate land uses. This system assumes that only nine factors exert influence over the land's capability and suitability for development, and that this influence is equal among factors. While this assumption is useful and not unrealistic in doing the general land use analysis, it is also not unrealistic to expect some modifications in the summary uses. Some summary scores must be adjusted to reflect an influence stronger than any combination of factors.

The adjustment process begins with review of the Summary Uses and the use of in-house knowledge of specific areas to question and re-evaluate some of the summary allocations. If the use assigned to a parcel appears to be inappropriate, the parcel is further evaluated to verify or deny the need to amend the summary use. This is done with a field check of the site and/or an investigation into the history of any actions taken to rezone, divide or develop it.

In some cases, a single capability or suitability factor can have an overriding impact on its use, but because the LUAS values all factors equally, the significance of a single factor can be over-shadowed by the other eight. For instance, a parcel that has a summary use of agricultural with a soil capacity of one (LUAS rating, unsuitable for farming) cannot realistically be put to such a use. In this case, the category with the next highest score was determined as most suitable.

During the first run of the L.U.A.S. when ties resulted between two or more land uses (this usually happened between agriculture and open space)

the final use was determined by the following criteria:

1st - Use the two or more land uses that tied.

2nd - If the cell is surrounded on three sides by one of the tied land uses, select that one.

3rd - Go with existing land use, as shown on the Jerusalem Township current land use map (T.L.C.P.C.).

4th - For intersections on Jerusalem Road, go with a commercial/industrial rating if it is one of the uses that tied.

5th - If none of the above apply, select the land use that is on two sides or most predominant in the surrounding area.

LAND USE DISTRICTS

The color coded summary use map is only the first step to a completed land use plan. Major land use categories (agriculture, commercial/industrial, recreational commercial, open space, residential) need to be generalized from the small scale data squares to larger planning areas or districts, defined by physical and legal barriers.

The two districts defined by physical boundaries are the parts of Crane and Cedar Creeks encompassed by the FIA flood hazard areas. The remaining districts are divided by dikes, ditches, canals and various roadways throughout the township.

The ideal use for each district was determined by overlaying the district map and the Land Use Allocation System Summary Map, then calculating the number of squares in each use category for a district. The land use with the largest number of squares was then assigned to the total district.

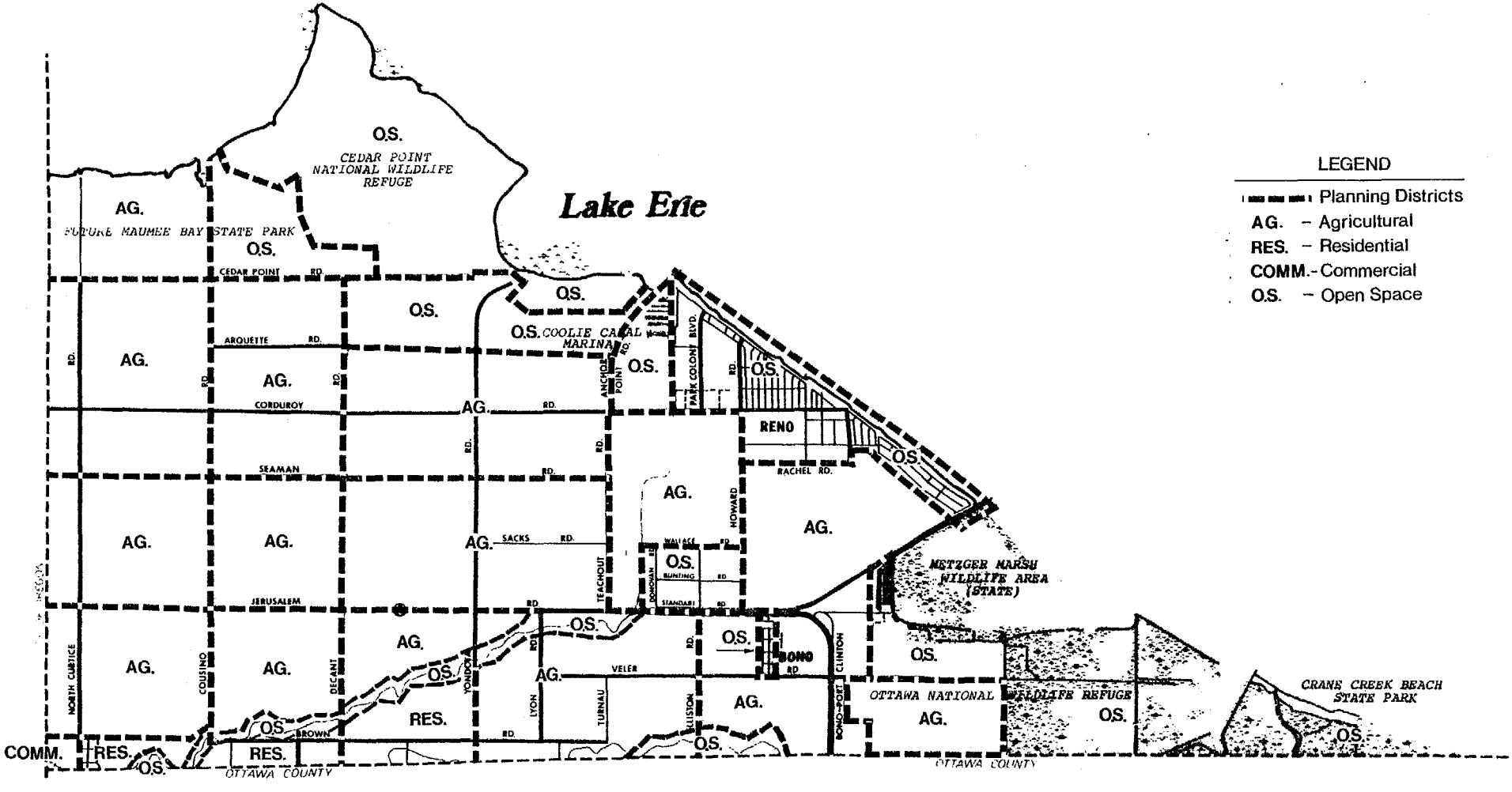
SUITABILITY LAND USE

The suitability land use map, an end product of the generalized district maps, is then the "ideal" land use for any given area. Open space was automatically assigned to the wetland areas and includes park and wooded lands. The residential area incorporates not only housing uses, but neighborhood scale commercial facilities and recreation areas as well, while the agricultural areas would include farm buildings and farm homes.

Commercial/Industrial areas would include everything from light industrial parks to office parks, community and regional shopping facilities. Recreational commercial uses would include marinas, campgrounds and sportsman clubs (gun clubs, hunting clubs, etc.).

The suitability land use, however, must be evaluated in terms of the needs for varying amounts of uses in a third phase before a final land use plan can be chosen. Furthermore, change in any factor could indicate a change of ideal land use assignment, such as the addition of public sewer and water lines. In fact, the advisability of extending utilities to a given area could be determined by a dry run refactoring of any changes it would cause in the ideal land use summary.

The suitability land use assignments are not meant to be used for determining the use of individual pieces of land, but rather as a guide to major land separations. Any particular site would still have to be evaluated and then zoned for a particular type of industry, park or residence. In other words, a suitability land use plan is not a zoning map.



JERUSALEM TOWNSHIP

SUITABILITY LAND USE & PLANNING DISTRICTS

0 1/2 1
SCALE MILES

PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

plate

CHAPTER 9

jerusalem township land use plan

CHAPTER IX

JERUSALEM TOWNSHIP

FUTURE LAND USE PLAN

The Land Use Plan that follows represents a composite of the elements presented in the preceding sections, and takes into account the realities of current development trends, and the goals and policies of Jerusalem Township.

It should be emphasized that the Plan represents what is felt to be the best future use of land based upon today's knowledge and trends. The Plan is by no means rigid or unchangeable. It should be re-assessed periodically and adjusted to meet new trends and to allow flexibility in cases where an alternative use may be as desirable as the one initially proposed.

It should be noted that the Plan as presented is intended to show generalized land use and is not intended to indicate precise size, shape or dimension. The proposals reflect future land use recommendations and do not necessarily imply short range zoning proposals.

Because the map represents general policies, it cannot be an absolute textbook for future growth within the township. Most lines on the map are not shown as definite boundaries, but as suggested general areas for a specific character of development. It is the daily and monthly implementation of the development process via the township officials and the County Planning Commission that really formulates the detail and character of the master plan as it is made real over the next ten to twenty years.

There are, however, some guidelines for use of the master plan map. These are as follows:

Residential Areas

Three basic types of residential areas are shown on the map. These are not indicated by the characteristic designations of housing type but by density. These density figures indicate a range of densities of dwelling units per gross acre. They do not designate whether the form of housing must be in single family units, two family units, mobile homes, or apartments. This distinction is made in order to encourage the use of flexible development concepts which can best meet both private housing market needs and the public interest. Within a single development, there might be single family dwellings, townhouses, and apartments each positioned according to the best location for view, accessibility, and availability of public services. It becomes the responsibility of the County Plan Commission and the Township, then, to decide whether or not a proposed project, which falls within the overall density guideline, is suitable for the area proposed.

The HIGHEST DENSITY RESIDENTIAL area is located in the southwest corner of the township. It is the area when the majority of residential activity is occurring. This may be due to the fact that the soils are better drained and more suited to residential development, influence of the proposed Maumee Bay State Park, and its proximity to the unincorporated Village of Curtice.

It should be noted that soils were rated in relationship to other soils in the Jerusalem Township. All township soils have a moderate to severe wetness problem requiring drainage or special construction. The moderate rate in this area indicates the relative ease in overcoming construction and soil

strength problems. Sanitary sewers are not expected to be constructed during the planning period, or before 2000. Therefore, all residential development must rely on on-site disposal of septic effluent.

While the minimum density allowed is one dwelling unit per acre (county subdivision and health regulation), the density of development in this as well as all other residential areas is subject to the availability of potable water and a suitable sanitary system. Availability of public water may reduce the amount of land required for an on-site sanitary system.

MEDIUM DENSITY RESIDENTIAL includes the existing residential developments in Jerusalem Township (Reno Beach, Bono, Howard Farms). These areas were platted in the 1920's, with much of the original housing existing today. A large portion of these platted lots are undeveloped due to small lot sizes, poorly drained soils and flooding problems. While development of these areas is not discouraged, larger lot sizes are needed and additional building cost incurred to overcome these problems when building new houses.

THE LOW DENSITY RESIDENTIAL area lies adjacent to the high density area, in the southern section of the Township. As with the high density area, soils in this section are the best suited in Jerusalem Township for residential development.

The rational for developing the low density classification is to prevent the strip residential development that is occurring along some township roads, keep the land in agricultural production, and reserve areas for future growth.

If housing development follows the pattern of the last decade (12 new dwelling units per year) there will be a need for approximately 150 new

units by 2000, all of which can be accommodated within the high density area. Therefore, the low density residential area should be developed at a density of one dwelling unit per 10 acres until such time that additional high density residential land is needed.

Agricultural Area

The agricultural area is characterized by substantial amounts of prime farmland and a concentration of working farms. This area contains soil that is highly desirable for agriculture. Because residential development and agricultural activities tend to conflict, there is a real need to restrict such development if agriculture is to remain a viable activity in Jerusalem Township. It is, therefore, recommended that single family dwellings only be allowed on an arbitrarily large lot size (e.g. 20 acres or more). Such single family development is more compatible with surrounding agricultural activity, and will prevent the encroachment of subdivisions and frontage development onto farmland which often leads to the demise of the latter. The boundaries shown on the map should not be considered inflexible. However, all of this area, as well as the major portion of the Township, is highly suited for crop production. This area would be the basis on which to develop an agricultural district for the long term preservation of farm lands.

Open Space

The majority of Open Space is located in the parks and wildlife areas, with the remainder along Crane and Cedar Creeks. While portions of the State and Federal Lands are currently being farmed, they are classified as open space because of their intended use and ownership.

The areas along Crane and Cedar Creeks are classified as Open Space because they are flood plain areas. While flood prone areas can and are being used for agriculture, residential developments should be precluded.

Commercial/Industrial

The commercial areas located on the Land Use Plan are those areas most appropriate for commercial growth, which contain a substantial amount of commercial activity or which have been experiencing residential growth. These areas are the intersections of Jerusalem Road and North Curtice, Cousino and Teachout Roads, and at Brown and North Curtice Road.

While a portion of Jerusalem Road has been indicated for commercial growth, proper planning of these establishments is essential to prevent strip development. It is recommended that only small portions of Jerusalem Road be zoned for commercial development at one time. These development areas should be phased in and rezoned as demand is indicated. It should be noted that while certain locations have been designated for commercial development, these areas are not inflexible, depending upon future demand. However, a central goal of the land use plan is to encourage commercial growth in a few areas to prevent scatteration. Commercial areas should be limited in number, and located accordingly.

Development of a heavy industrial area is not expected for Jerusalem Township. For this reason it is recommended that light industry be located in the commercial areas.

Recreational Commercial

This classification was created to deal with the increasing pressures for more recreation related businesses (i.e. marinas, campgrounds). The two

areas identified are adjacent to Ward and Coolie Canals, with existing recreational commercial activities and access to Lake Erie. These areas need to be better regulated, in order to protect the environmentally sensitive areas and adjacent residential developments, and provide for better site design.

Conclusion

The increasing population and new park development in the community will generate additional demands upon Jerusalem Township for services. If the township is to meet these needs, it is essential that effective land use controls be developed along with the Land Use Plan.

Existing and potential problem areas need to be recognized and put in perspective, so that future development can be directed accordingly. Zoning policy, subdivision controls and other implementation measures can then be used to guide future growth in those directions. A well designed and properly implemented Land Use Plan will aid Jerusalem Township in successfully serving the needs of its future citizens and taxpayers.

I. LAND USE CONTROL - ZONING RESOLUTION

One of the basic purposes of this Land Use Plan is to provide a logical and legally sound basis for the Jerusalem Township zoning resolution. Without a reasonably up-to-date comprehensive plan, any zoning map is subject to criticism and adverse review by the courts.

The zoning resolution can, and should, reflect the basic elements of the plan. This does not mean that each and every parcel must be rezoned to conform to the plan. Rather, some flexibility should be made. This involves as much the structure of the zoning categories offered, as the actual designations of land parcels. Discussed below are possible modifications to the zoning resolution.

Planned Commercial District

The current zoning resolution provides the Township with limited opportunity to review proposed commercial projects. There will be increasing pressure for commercial development along State Route #2. While the plan does not recommend continuous strip development, some commercial development--preferably at intersections--will and should occur. To better coordinate this development, a form of commercial PUD giving the Township the opportunity to review specific proposed uses, site plans and access may be appropriate, in addition to the general zoning review now provided. Commercial Zoning District should require a site plan and/or commercial plat.

Flood Plain Ordinance

Jerusalem Township should adopt a flood plain ordinance to limit development in low-lying flood prone areas. This will reinforce and strengthen the County's participation in the Federal Flood Insurance Program.

Agricultural District

The Township should encourage the creation of agricultural districts for large farm areas, designated in the plan. This designation will provide special incentives for farmers to retain existing prime agricultural land in 20 to 40 acre minimum lot area. Further detailed studies to specifically identify agricultural land for such districts should be made.

Deed Transfers (Lot Splits)

The County, with the support of the township, should approve lot splits only if they meet all of the following conditions:

a. Does not violate 2½:1 depth-to-width ratio.

b. Does not exceed maximum allowable lot splits.

c. Does not violate township zoning regulations.

d. Is 1) in soil capability area and is minimum one acre size (in areas where public sewer and water is not available), or;

2) in soil capable area and is minimum 20,000 sq. ft. lot and will be able to tap into sewer within 5 years, or;

3) is incapable soil area, but will tap into sewer immediately.

Commercial/Industrial Zoning

The commercial zoning category should be modified so that residential development is not permitted in such areas. This would truly designate and reserve this land for commercial use. In direct relation to this, land that is currently zoned commercial, but realistically stands a better chance of residential development should be zoned residential. The Township can reserve areas for commercial or industrial development even if the LUAS system did not indicate a priority for industrial use on specific sites.

II. UTILITIES

The availability of utilities is often a more effective mechanism for controlling development than zoning or other land use controls. While the provision of utilities is generally not within the powers of the Township, this plan addresses the issues in order that the Township can express a viewpoint, and for the consideration of the County Commissioners.

The following policies should be adopted by Jerusalem Township to guide utility expansion within its boundaries:

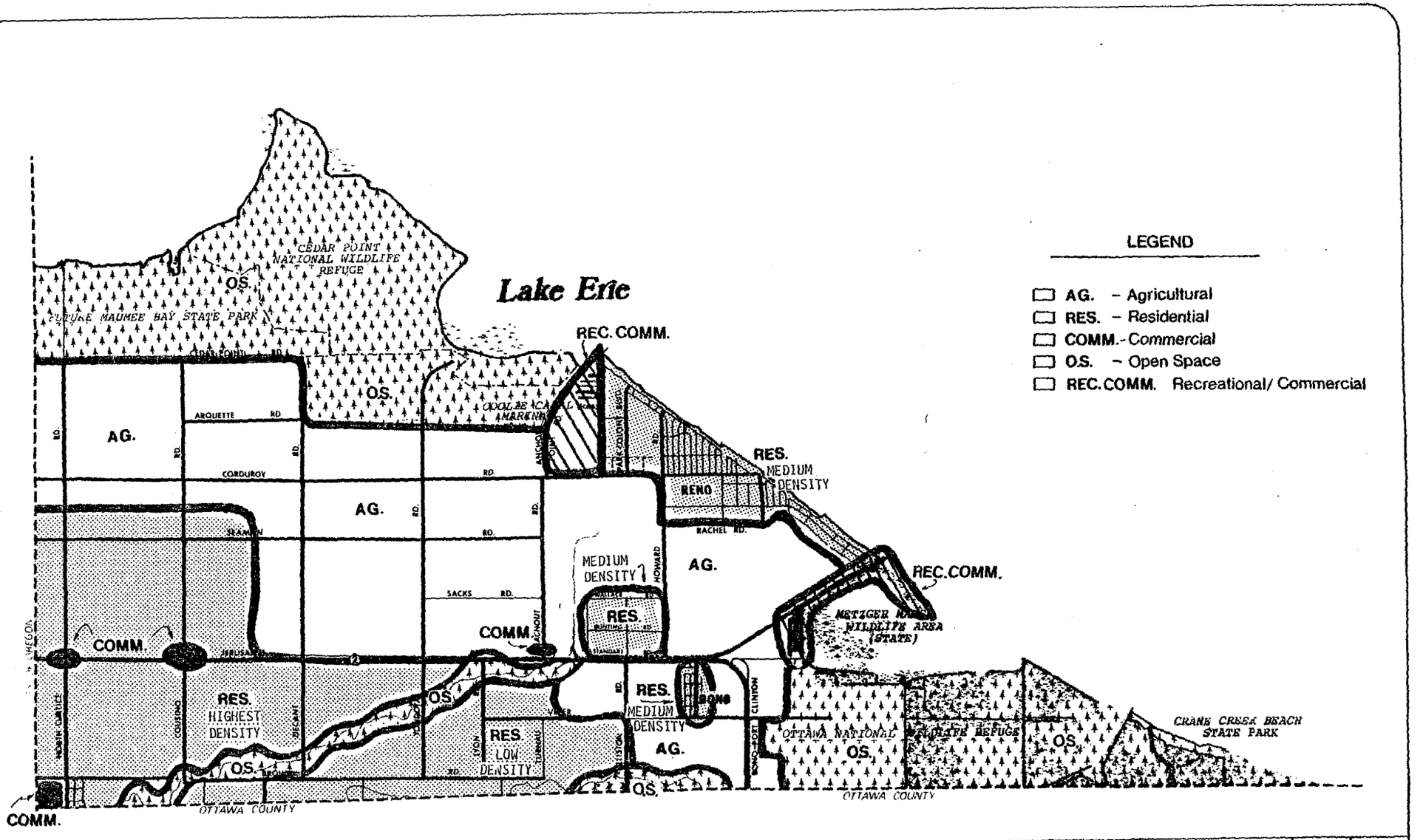
Policy 1 - Revise "Water and Wastewater Plan" to remove urban utilites extension into aaricultural areas.

Policy 2 - Work with Lucas County in the planning and regulation of on-site sewer and water systems in areas where soils are suitable for development.

Policy 3 - Within the unsewered areas designated for residential development allow a density of one D.U. per acre for soils capable of on-lot septic systems, and one D.U. per 5 acres on unsuitable soils.

Policy 4 - Allow multi-family or residential developments only when and where adequate sanitary systems can be provided.

Policy 5 - When public water and/or sewer lines are extended to accommodate a new development (i.e. subdivision, shopping center), the developer of the project will be responsible for all front end construction costs. Under this system the developer would be reimbursed, in part, each time a user hooked into the line.



JERUSALEM TOWNSHIP

LAND USE PLAN

SCALE 0 1/2 1 MILES

PREPARED BY TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

17 plate

appendix A

APPENDIX A

AN OVERVIEW OF THE OHIO CAPABILITY ANALYSIS PROGRAM*

The Ohio Department of Natural Resources (ODNR) has a program to assist local agencies in the use of natural resource information. The land capability analysis program in the Division of Water analyzes resource data, such as soil, in terms of its ability to support various land uses, such as homesites. A computer mapping and information storage system, the Ohio Capability Analysis Program (OCAP), was developed by ODNR to assist with the land capability analysis program. The terms OCAP and land capability analysis are used more or less interchangeably. OCAP having become synonymous with the land capability analysis concept OCAP is not the only tool for do ing a capability study, but it is of major importance in Ohio.

According to a questionnaire sent by ODNR to local and regional planning agencies throughout Ohio, most agencies think natural resource information is valuable. Most use it to some extent in the planning process, but they need some outside assistance in interpreting the data. ODNR has collected soil, geology, and ground water information for many years. The information is not always easy to understand, and planning agencies seldom have a large staff with expertise in using natural resource maps. The object of the land capability analysis program is to translate detailed resource maps available within ODNR into maps that local people can easily use.

To illustrate why this is necessary, consider what has to be done to interpret a detailed soil survey to evaluate a land use problem.

*This section is contained in the ODNR "User's Guide to the Ohio Capability Analysis Program", Dec. 1978.

Suppose a planner, sanitarian, or other local official is concerned that many homes are being built outside sewer service areas where septic tanks will not work properly. As responses to the ODNR questionnaire indicate, this is a major land use problem in the state. The planner has a published detailed soil survey with which to work, but he or she must interpret the information on soil maps in terms of septic system limitations. First, he has to cut and paste together a map of the county from a set of maps in the detailed report. These maps are at a scale of 4"=1 mile, which means the county map will be large enough to cover a wall. This is not a convenient map with which to work. After assembling the pieces, each map unit must be interpreted. A map unit is outlined on the soil map and indicates a particular combination of soil type and degree of slope. The planner identifies the map units with severe limitations for septic systems and then must flag those units on the county map. Perhaps he will choose to color in red each unit that is severe, but regardless of how he chooses to identify the units, it is a time-consuming process. In many Ohio counties there are over 70 map units, and in some the figure goes as high as 250. When the planner is finished, he will have a map of the county with all the severely limited soils for septic systems colored red. This is very useful, but he cannot change the scale of the map to compare it easily with other information, such as land use, nor can he easily pick out a watershed, township, or municipal area. If he wants to look at soil limitations for recreation or homesites, he has to go through the same process. The final map is hard to store and difficult to update or change.

Obviously, there are many problems in dealing with soil information as it is published. There are equal difficulties in interpreting and using other natural resource maps, as well. If counties are to be persuaded to

add resource information to the social, economic, and population data considered in the planning process, it has to be easier to interpret and use. OCAP solves the major problems by mapping, storing, updating and rescaling the original resource maps efficiently and quickly. The product from a land capability analysis using the OCAP system is a set of maps defining major natural resource limitations and advantages in a county. With these maps, the planner or other user can rapidly evaluate a county's problems and potential.

Capability maps produced by OCAP have many uses. The county planning commission could employ the maps frequently to review and evaluate development proposals for subdivisions, schools, recreation sites, or shopping centers. With a capability map, they can rapidly see whether a proposed development will encounter or cause any major environmental problems. They can request more site information or suggest modifications to the proposal. Zoning is another planning function that can benefit from a capability analysis. Zoning resolutions drawn up using environmental information have a sounder basis than those without. Residential development can be restricted to areas served by water and sewer lines when maps are available showing severe soil limitations for septic systems. Capability maps can also be used when writing or updating a county's general development plan. The capability maps can act as a guide to the planner for proposing where future development would best be suited. Thus, industrial parks are not suggested for areas with unstable soils or residential development in areas susceptible to flooding.

Many other agencies and county officials can use capability maps besides the planning commission and planning staff. The county auditor can use the detailed soil information to evaluate soil productivity and determine the

preferential tax for agricultural land. The county engineer, sanitary engineer, or health department can use the soil maps in evaluating highway and waste disposal problems. Soil Conservation Service and Cooperative Extension agents can use the maps in their work with local farmers and homeowners. Private firms and individuals including investors, developers, farmers, contractors, and homeowners could use the maps as well.

There are several steps to a capability analysis study using OCAP. The first step is gathering basic resource information and other data, including boundary and land use maps. Much resource information is available from ODNR, Divisions of Lands and Soil, Water and Geological Survey. Other information comes from the counties themselves, from interpretation of aerial photography, or from agencies such as the Soil Conservation Service and the U.S. Geological Survey. The most important information is a detailed soil survey, which is available for almost three-fourths of the state. A general soil map has less information, but can be used in place of the detailed survey. In addition to the soil survey, other types of resource information include topography, geology, ground water, land use (including some evaluation of vegetation), political boundaries, watershed boundaries, and natural areas.

Once the original maps are assembled, they are transferred to a computer format through a process called digitizing. The end of product digitizing is a computer map which duplicates the original map. The computer map does not look like maps with which most people are familiar. Characters similar to those on a typewriter are used to represent soil types or different categories of land use. Also, no road pattern or town names are on the computer map. To make the computer map easier to read, a transparent overlay with road patterns and other information is used with it.

Color computer maps which are easier to read are also being produced.

If the OCAP program did no more than duplicate maps that already exist, there would be no advantage to using it. The duplication process is only the first step, after which many options exist for using computer maps. An important option is that of rescaling the maps. Frequently, resource maps are at different scales. This is a problem for people dealing with them, because comparison of different resources is difficult. OCAP can adjust the resource data to a uniform scale, usually 1"=2000'. Information can also be rescaled to meet various needs. While township maps at 1"=2000' are very useful, county maps at that scale are large and difficult with which to work. County maps are frequently produced at a smaller scale such as 1"=5000', to make them easier to handle.

Another important option in the OCAP system is the ability to select information from large county maps for boundaries within them, such as townships. Information is not available frequently for political jurisdictions or natural boundaries within counties. If the planning staff wants to work with one township or watershed, they must piece together information for these areas. However, boundary lines--including townships, watersheds, census tracts, and sewer districts--can be incorporated into OCAP, allowing the system to readily produce maps of resource information for areas within any of these boundaries. The boundaries can also be used with maps analyzing several resources for a particular land use. For instance, the potential for homesites might be analyzed by combining five types of resource information, and the analysis results produced as township or watershed maps of homesite potential.

Several other features of the OCAP system are very important. It is

possible to put together data for adjacent areas. For instance, it might be desirable to merge two or more counties to look at a regional problem. Information can be updated very easily, which is important with rapidly changing data such as land use. Tables of information can be produced, as well as maps, to summarize acreage and percent of an area with a certain characteristic. This can be done using boundary information plus some other information, such as land use or potential for homesites. The result might be a listing of land use by township or potential for homesites by census tract. A third important feature is the ability to look at data within a certain radius of a particular site. If, for example, a lake were proposed, maps of homesite potential could be generated for areas within 1000 feet of the lake, 1/2 mile of the lake, and 1 mile of the lake. The radii can vary, as can the maps produced or the site from which radii are generated.

Finally, two features in the OCAP system allow for enlarging the data base and for analyzing it in a variety of ways. It is possible to link additional information to the resource or boundary maps. The most important example is the soil "external attribute file." This is information that can be associated with individual map units on the computer soil map. This information includes: percent of slope, permeability of soil, depth to bedrock, and ratings for limitations for septic tanks, homesites and other land uses. By linking the external file with the computer soil map, any of the attributes can be mapped. This eliminates the complex problem of manually coloring a soil map to locate potential septic tank problems. The computer assigns a particular symbol to areas on the map with severe limitations and prints the map in a matter of minutes, unlike the manual process which could take months. External files can be linked to any resource or

boundary information, such as census tracts, natural areas, or bedrock type.

Analysis of resource data can be done in several ways. Essentially, OCAP enables the user to evaluate all or selected types of natural resources maps at once. This is accomplished by overlaying them in the computer, much as would be done if one were analyzing them manually. The difference is that the computer can handle more detail and larger areas, and can accomplish the task faster. The person doing the analysis specifies the information to be overlaid and how it will be evaluated by the computer. The computer does the computation and prints a map showing limitations or potential for particular land use. This can be done with as few as two maps or as many as thirty, and can include information from the external file.

OCAP solves many problems by mapping, updating, analyzing, and storing information very rapidly and efficiently. The time required to develop a computer data base for a county varies from six months to a year depending on size of the county, complexity of the soil information, availability of other information, and particular needs of the county being studied. In an effort to make capability analyses as useful as possible to counties, ODNR staff works closely with local people to determine their needs and the land use problems in the county. For instance, rural areas in Stark County are developing very rapidly, so much of the analysis concentrated on identifying productive farm land, locating problem areas for septic tanks and groundwater supplies, and evaluating potential recreation areas. People from the Stark County planning staff participated actively in the study, and maps generated in the analysis are being used in updating their general development plan.

The final product of a capability study is a set of maps, some with one type of information, such as land use or degree of slope, and some with

a combination of several types of information. The latter may be used for evaluating potential for a particular land use. A map of homesite potential could be printed with symbols to indicate three levels of information, such as slight, moderate, and severe limitations. It could also be printed to indicate severe limitations, such as shallow bedrock which would be prohibitive to basements or steep slopes which would make construction difficult. Each character on a map at a scale of 1"=2000' represents an area of 1.15 acres. This degree of detail is important if the local agencies are to make effective use of the information, especially in areas where land use, soils, or slope vary greatly within a small area. In spite of the detail, computer maps should not be used in place of a site analysis, because the source information on which the computer maps are based is not accurate at the site level.

Map A.1 shows the counties, townships, and other areas within the state where OCAP studies are complete or underway as of July, 1978. OCAP studies are undertaken at the rate of about eight per year. If you are uncertain whether your county has a study underway, check with your county planning commission or with ODNR. Studies are done on a cost-sharing basis; the county share for a standard 1"=2000' study is approximately 15 per cent of the total personnel and computer cost of a study.* After the initial OCAP study is complete, counties receive some additional OCAP assistance without chsrge every year.

*Costs for projects other than the standard 1"=2000' study vary. Large scale studies (1"-1000') are more costly, while studies at a smaller scale or involving fewer maps may be less expensive. See the enclosed cost summary listing current OCAP project rates.

APPENDIX REFERENCES

Resource Analysis has produced numerous reports for the counties and other areas in which we have worked. Several are listed as references for OCAP users who are interested in how OCAP studies have been done in several counties.

Dunn, Thomas J. and David C. Marshall, Land Capability Analysis, County Report No. 1, Lake County, Columbus, Ohio: Ohio Department of Natural Resources, 1975.

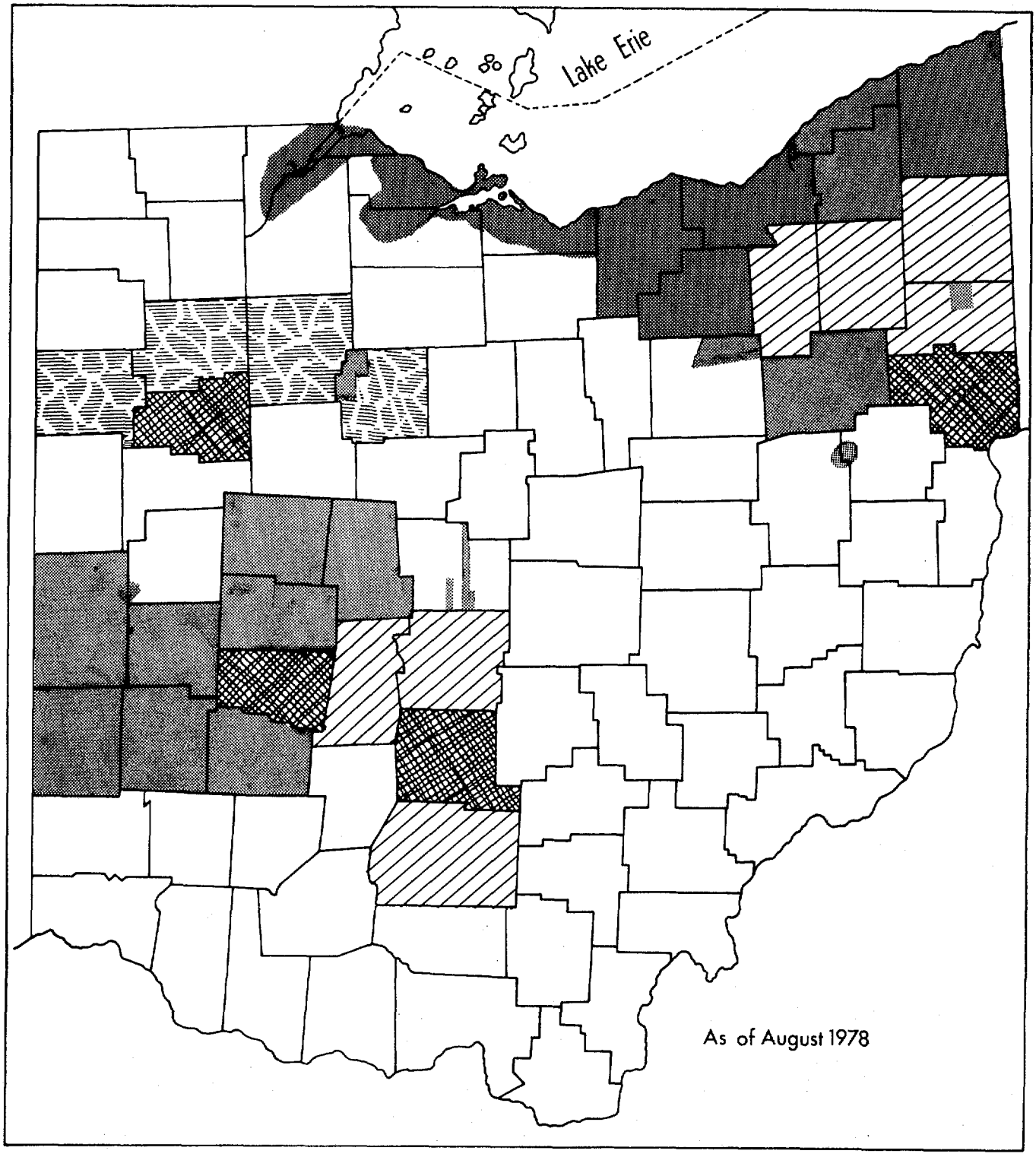
Gordon, Gaybrielle, Land Capability Analysis in the LUC Region, Columbus, Ohio: Ohio Department of Natural Resources, 1978.

Maxson, Gaybrielle, Land Capability Analysis, County Report 3, Stark County, Columbus, Ohio: Ohio Department of Natural Resources, 1975.

Maxson, Gaybrielle and Michael C. Huber, Salem Township, Champaign County, Land Capability Analysis, Columbus, Ohio: Ohio Department of Natural Resources, 1976.

Maxson, Gaybrielle, Land Capability Analysis in the Maimi Valley Region, Columbus, Ohio: Ohio Department of Natural Resources, 1977.

OCAP PROJECT AREAS



COMPLETED PROJECTS

ACTIVE PROJECTS

SCHEDULED PROJECTS

PROPOSED PROJECTS

SOIL FACTORS

CONSIDERED FOR THE OCAP LIMITATION

MAPS*

*Information taken from the "User's Guide to the Oh
Analysis Program", Ohio Department of Natural Reso
pages 59through 72.

A - Soil Map Units

Map categories:

1. Algiers silt loam - Ag
2. Berks silt loam - BeE
3. Berks silt loam - BeF
4. Blount silt loam - BoA
5. Blount silt loam - BoB
6. Brookston silty clay loam - Bs
7. Carlisle muck - Ca
8. Carlisle muck, ponded - Cc
9. Casco-Eldean complex - CdD2
10. Celina silt loam - CeA
11. Celina silt loam - CeB
12. Crosby silt loam - CrA
13. Crosby silt loam - CrB
14. Crosby-Urban land comples - CsA
15. Del Rey silt loam - DeA
16. Del Rey silt loam - DeB
17. Edwards muck - Ed
18. Eel silt loam - Ee
19. Eldean silt loam - EmA
20. Eldean silt loam - EmB
21. Eldean silt loam - EmC2
22. Eldean-Urban land complex - EpB
23. Fox loam - F1A
24. Fox loam - F1B
25. Fulton silt loam - FuA
26. Gallman loam - GaB
27. Genesse silt loam - Gn
28. Glynwood silt loam - GwB
29. Haskins loam - HdA
30. Haskins loam - HdB
31. Henshaw silt loam - HeA
32. Henshaw silt loam - HeB
33. Homer silt loam - HoA
34. Homer silt loam - HoB
35. Latty silty clay - La
36. Latty silty clay, occasionally flooded - Lb
37. Linwood muck - Ln
38. Lippincott silty clay loam - Lp
39. Lippincott-Urban land complex - Ls
40. Martisco mucky silt loam - Ma
41. Martisco Variant silt loam - Mc
42. Miamian silt loam - MhB
43. Miamian silt loam - MhC2

Description:

The detailed soil map is the most important single source of information for an OCAP study. It shows patterns of map units (Map 5.3). A map unit is a combination of letters and numbers which show: soil series (soil type), percent slope, and existing erosion. The map is coded with combinations of letters and numbers, such as KeC2. The letters Ke stand for the soil series, in this case Kendallville silt loam. The letter C is the percent of slope, 6-12%. The number 2 is the existing erosion; number 2 stands for moderate erosion and number 3 for severe. Published soil surveys for each county provide additional information for each soil map unit.

Data Gathering:

Detailed soil information is gathered by a team of soil scientists who walk over an entire county, collecting soil samples and mapping the soil and slope categories. This exhaustive process takes four or five years. This type of survey is termed a medium-intensity survey. It does not show absolute changes from one soil type to another, and it should not be used for site analysis. In other words, it is detailed enough to give anyone using the maps a very good idea what problems they might find in an *area*, but not specifically the problems they would find on a particular *site*.

Value:

The detailed soil map in computer form is no easier to read or work with than the original printed in the soil reports. One of the objects of OCAP is to simplify the use of soil maps by mapping soil properties and limitation ratings through the external file. Thirty-one maps, which will be described of length, are usually stored in the external file.

B - Soil properties mapped from the external file*

Twenty-three maps of soil properties are described below. A soil property is a characteristic of a soil map unit, such as its texture, its ability to transmit water, or its ability to hold water. Some of the properties are described for the soil as a whole, while some are described by layer or horizon (Figure 5.3). For the latter, information is available at four depths below the surface, 0-15", 15-30", 30-45", and 45-60". The first map of the soil nearest the surface may not extend as far as 15", but maps of the lower soil layers correspond reasonably well to the depths listed.

Some map units are not rated or are not rated for some properties. Units not rated include gravel pits, quarries, made land, cut and fill, and water. Urban land complexes have a slope rating, but because most of the land has been disturbed by building, no other ratings are assigned to the map units.

Properties Mapped for the Soil Series as a Whole

1. SUSCEPTIBILITY TO FLOODING

Map Categories:

1. Not rated
2. No reasonable possibility of flooding -- None
3. Flooding unlikely; possible under abnormal conditions -- Rare
4. Flooded less than once in two years on the average -- Occasional
5. Flooded more than once in two years on the average -- Frequent

Description:

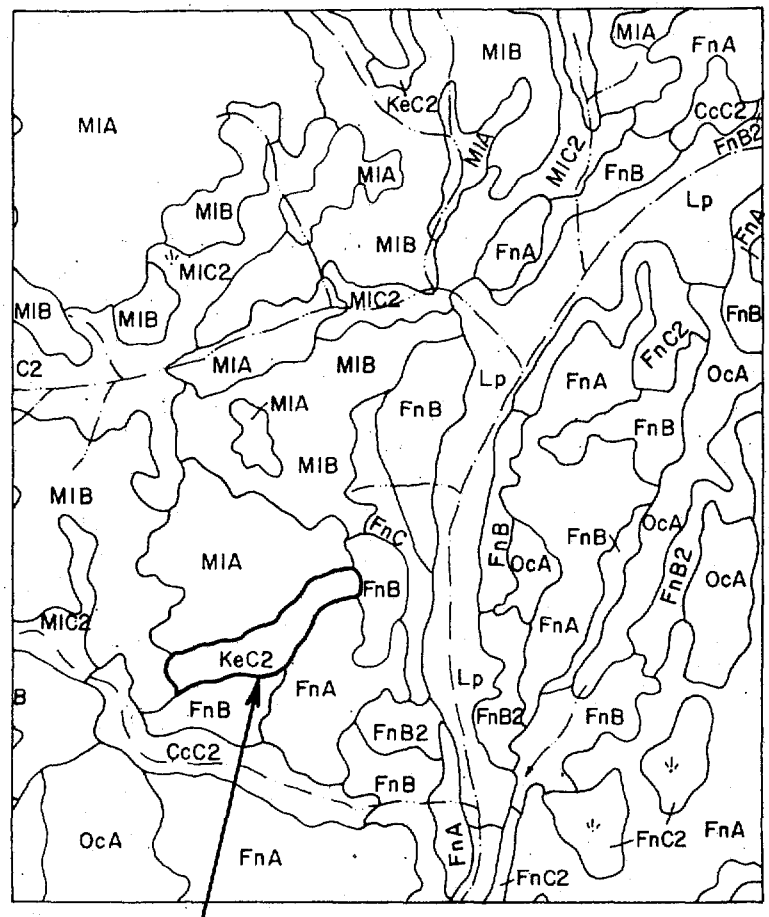
If a soil series shows characteristics of periodic flooding, the description of the series in the soil survey report notes this. The flooding map based on soil information does not show man-made changes that alter the flooding pattern, but it is useful in lieu of other flooding information. A detailed flood hazard analysis is the only way of defining all areas subject to flooding. This information may be added to the OCAP flooding files as it becomes available. Flood hazard analysis studies are presently underway in many watersheds in the state. (Also see Flood Prone Maps).

Value:

Flooding presents the most serious environmental limitation in Ohio to any development involving structures. Floods can destroy lives and property, or at the least, create a costly mess. The cost is not only to the individual property owner, but also to the tax-payer who contributes to evacuation, clean-up, and redevelopment operations. Structures which are not flood-proofed and which would increase flood height should be precluded from floodplains (the area subject

*Much of the following information comes from the Soil Conservation Service Guide for Interpreting Engineering uses of Soil and county soil survey reports.

Map 5.3



Portion of a detailed soil map

Champaign County

Ke = Soil Series - Kendallville Silt Loam
C = Percent of Slope - 6-12%
2 = Existing Erosion - Moderate

Figure 5.3

External Attribute File Information by Horizon

Soil Map Unit: Gallman loam - GaB

12	Horizon Depth (inches)	8		26		53		60
1	Flooding	none		Information for attributes 1 through 11 stored for whole map unit				
2	Drainage Class	well drained						
3	Depth to S.W.T.	> 6 inches						
4	Capability Class	I						
5	Potential Frost Action	low						
6	Depth to Bedrock	> 5 feet						
7	Slope	0-4%						
8	Stoniness	none						
9	Texture Modifier	shaley gravelly						
10	Erosion Factor "K"	32		Information for Attributes 13 through 22 ↓ stored by layer or horizon ↓				
11	Erosion Factor "T"	3 tons						
13	Shrink-Swell Potential	low		low		moderate		low
14	Unified Class-Primary	ML		ML		CL		CL
15	Unified Class-Secondary	ML		CL		GM		GM
16	AASHO Class-Primary	A-4		A-4		A-6		A-2
17	AASHO Class-Secondary	A-4		A-6		A-2		A-6
18	Corrosion Potential-S	low		low		low		low
19	Corrosion Potential-C	high-low		high-low		high-low		low
20	Permeability inches per hour	2.0-6.0		6-6.0		6-6.0		> 6.0
21	Texture - Primary	loam		loam		clay loam		clay loam
22	Texture - Secondary	loam		loam		clay loam		clay loam
23	Available Water Capacity	6.4 inches		Information for Attirbutes 23 through 32 stored for whole map unit				
24	Cultivated Crops	slight						
25	Sewage Effluent	slight						
26	Homesites	slight						
27	Lawns, Landscaping	slight						
28	Streets, Roads	slight						
29	Intensive Recreation	slight						
30	Extensive Recreation	slight						
31	Sanitary Landfill	slight						
32	Prime Agricultural Land	prime						

to immediate flood damage). Floodplains can be used for open space, recreation, or agriculture. OCAP maps which delineate flood-prone areas should be used for every evaluation of structural development to point out areas with severe limitations.

2. DRAINAGE CLASS

Map Categories:
1. Not rated
2. Very poorly drained
3. Poorly drained
4. Somewhat poorly drained
5. Moderately well drained
6. Well drained
7. Somewhat excessively drained
8. Excessively drained

Description:
Drainage class is an evaluation of the rate at which water is removed from soil under natural conditions. It does not consider artificial drainage. Drainage class and permeability are closely related, but they are not the same. Drainage ratings consider topography and classify the soil series as a whole. Permeability ratings are assigned to each horizon, and topography is not a factor. Drainage class can be used as a measure of soil with wetness problems.

Value:
Wetness affects all land development to some extent and must be compensated for by artificial drainage or special building techniques. Building in poorly drained soils can result in wet basements, cracked foundations, flooded lawns, and other maintenance problems associated with excess water. Recreation and agriculture are also affected. OCAP maps showing poorly drained soil should be part of most development evaluations.

3. DEPTH TO SEASONAL WATER TABLE

Map Categories:
1. Not rated
2. 0-6 inches
3. 6-20 inches
4. 20-40 inches
5. 40-60 inches
6. >60 inches

Description:
This is not, as the name might imply, an indication of ground water depth. It is an indication of whether the soil is likely to be saturated with water above an impermeable layer at some time during the year (usually spring) and retained for an extended period of time. Poor drainage and shallow seasonal water table usually go together. Both maps indicate wetness problems for development such as those mentioned. Seasonal water table problems may not be as long-lasting or pervasive as drainage problems.

Value:
See drainage.

4. AGRICULTURAL CAPABILITY CLASS

Map Categories:
1. Not rated
2. I
3. IIw
4. IIe
5. IIs
6. IIIw
7. IIIe
8. IIIs
9. IVe
10. IVw
11. Vw
12. VIe
13. VIs
14. VIIs
15. VIIe

Description:
All soil map units are assigned a capability class rating to indicate their relative usefulness for crop production and pasture. Class numbers range from I, which presents no limitations to agriculture, through VII, which is severely limited land. Class numbers II through VII are followed by a letter which indicates the major problem associated with the mapping unit. The letter "e" indicates potential erosion, "w" indicates wetness, and "s", stoniness or droughtiness. There are a variety of ways of measuring the relative usefulness of land for agricultural production. The first map listed in Section VI shows the limitations for cultivated crops. There is also a map of prime agricultural land based upon the criteria set forth by the SCS in their Land Inventorying and Monitoring (LIM) program. The major difference among the three maps is in the number of categories and the detail to which severe problems are described. The capability class map is detailed, as is the map showing limitations for cultivated crops. The prime agricultural land map shows general categories of prime, nonprime, and developed land and does not describe the problems associated with the map units. The decision to use one map or another should be based on the need for detail.

Value:
One or the other map should be used when any development is considered to determine whether it is encroaching on prime farm land, and whether it is a desirable encroachment based on the development goals and objectives of the township or county. Prime farm land is an economically valuable resource that cannot be recovered once it is lost.

5. POTENTIAL FROST ACTION

Map Categories:
1. Not rated
2. Very low
3. Low
4. Low-Moderate
5. Moderate
6. Moderate-High
7. High
8. Very high
9. Variable

Description:
As the name implies, potential frost action is a measure of how freezing will affect the soil. If the soil is susceptible to the formation of ice lenses, upward or lateral movement of the soil may occur. When thawing takes place, the soil loses strength and collapses and this may result in damage to roads, sidewalks, or some structures. The soil is rated as having a low, moderate, or high susceptibility to frost action, and is evaluated to the depth where freezing occurs.

Value:
Potential frost action maps should be considered in highway or airfield design. It is less of a problem for buildings unless they are unheated structures with concrete floors. Sidewalks, patios, and driveways are also susceptible to frost heave. Modifications in drainage may alter the susceptibility to frost action. Frost heave may be a negligible problem for scattered homesites. For subdivisions or large scale commercial/industrial buildings, with parking lots, driveways, and roads, frost heave could create a major maintenance problem.

6. DEPTH TO BEDROCK

Map Categories:
1. Not rated
2. < 1'
3. 1-2'
4. 2-3'
5. 3-4'
6. 4-5'
7. > 5'

Description:
As the name implies, depth to bedrock is the depth below the surface where consolidated rock material occurs. Because soil survey information extends to 60 inches beneath the surface, depth to bedrock information extracted from the soil survey can only show where bedrock occurs within the first five feet below the surface. To determine the type of shallow bedrock, the texture map should be consulted. For more information on bedrock, consult the geology information that follows.

Value:
Shallow bedrock is a problem when installing septic tanks or utility lines, constructing a basement, plowing a field, or routing a highway. It may be a positive factor when building a large, heavy structure, or when quarrying the rock is contemplated. Some types of bedrock are more easily ripped or removed that others. The fourth horizon texture map should be consulted if there is a question of whether shallow bedrock can be easily removed.

7. PERCENT OF SLOPE

Map Categories:
1. Not rated
2. 0-2% (A)
3. 2-6% (B)
4. 6-12% (C)
5. 12-18% (D)
6. 18-25% (E)
7. >25% (F)

Description:
Percent of slope is measured by the number of feet of increase in altitude over a given distance. If a person climbs 50 feet in altitude over a distance of 100 feet, then the percent of slope is 50%. Slope should not be confused with elevation which only measures altitude above sea level. Contour lines on a topographic map show elevation, but the relative distance between those contour lines shows percent of slope.

Value:
Steep slopes are a prohibitive factor to development. It is costly to build on them, because truck access is difficult over 5% slope and building modifications are expensive. There are often severe erosion or slippage problems associated with any use of steep slopes. Severe erosion can clog streams and ditches and cause water quality and maintenance problems. Slips or landslides can do much damage, if they are severe enough to bury a road or topple buildings. Not all steep slopes are prone to slippage. OCAP slope maps are a major consideration in most evaluations of development.

8. STONINESS/ROCKINESS

Map Categories:
1. Not rated
2. 0
3. 1
4. 2
5. 3
6. 4
7. 5

Description:
Stoniness is a measure of the amount of large (10" or greater diameter) stones in or on the topsoil. Stoniness is mapped with a relative measure from 0 to 5. The higher the number, the greater the stoniness. Rockiness is a measure of the amount of exposed bedrock at the soil surface. The measure is similar. The presence of large rock fragments in the topsoil is a result of glaciation, weathering of residual rock in place, or gravitational movement of stones in unglaciated hilly areas.

Value:
The presence of large rocks or exposed bedrock at the soil surface is a constraint to many types of development. It is difficult to plow, to install a septic tank, to excavate for a basement, or even, to put up a tent. Stoniness and rockiness are not a problem in every county, but should be considered in those where the problem exists.

9. TEXTURE MODIFIER

Map Categories:
1. Not rated
2. None
3. Very Gravelly
4. Shaly
5. Very Shaly
6. Mucky
7. Gravelly

Description: See texture

Value: See texture

10. EROSION FACTOR "K"

Map Categories:
1. Not rated
2. 0.15
3. 0.17
4. 0.20
5. 0.24
6. 0.28
7. 0.32
8. 0.37
9. 0.43
10. 0.49

Description:
Erosion factor "K" is one of several components in the Universal Soil Loss Equation to measure potential

soil loss. Other components include rainfall, percent of slope, length of slope, soil management, and land cover. Erosion factor "K" is a relative measure of soil erodibility; the larger the number, the more erodible the soil. By itself, it is not sufficient to indicate potential erosion problems. A soil with a high erodibility factor in a flat area may erode less than a soil with a low erodibility factor on a steep slope.

10a. EROSION POTENTIAL (COMBINING EROSION FACTOR "K" AND SLOPE)

Map Categories:
1. No erosion
2. < 1 ton per acre per year
3. 1-2 tons
4. 2-3 tons
5. 3-4 tons
6. > 4 tons
7. Not Rated

Description: See Erosion Factor "K"

Value:
Erosion not only depletes the topsoil, but it also causes water quality problems by contributing to the sediment load of streams. The erosion potential map should be consulted for almost all development, because most involves some excavation which could result in erosion if not managed properly. Erosion potential is also important in evaluating agricultural land.

11. EROSION FACTOR "T"

Map Categories:
1. Not rated
2. Organic
3. 1 ton/acre/year
4. 2 tons/acre/year
5. 3 tons/acre/year
6. 4 tons/acre/year
7. 5 tons/acre/year

Description:
Erosion factor "T" is a measure of how much sediment loss a soil can tolerate in a year without harming its productivity. The categories are from 1 ton through 5 tons per acre. The information from the erosion factor "T" map is most useful when it is compared to the erosion potential map to identify areas where the erosion potential exceeds the erosion tolerance.

Value:
Erosion factor "T" is useful in evaluation of agricultural land and in the location of potential problem areas.

Properties Mapped for Soil Layers (horizons)

1. HORIZON DEPTH

Map Categories:
Categories vary--layers may be one inch to 60 inches in depth.

Description:
Horizon depth, as the name implies, is the number of inches in each soil layer. For instance, the first horizon or layer of Fincastle silt loam in Preble County extends from 0-11", the second layer from 11-36", and the third and last layer from 36-60".

Value:
Horizon depth is stored for reference, but it is seldom mapped or used in an analysis.

2. SHRINK-SWELL POTENTIAL

Map Categories:
1. Not rated
2. Very low
3. Low
4. Low-Moderate
5. Moderate
6. Moderate-High
7. High
8. Very high
9. Variable

Description:
Shrink-swell potential is the relative change in the volume of the soil with changes in moisture content. Soils that shrink substantially while drying or swell when wet have a high shrink-swell potential. The extent to which soils shrink and swell is influenced by the amount and kind of clay in the soil. Shrink-swell differs from potential frost action in that water rather than ice changes the soil volume and causes expansion.

Value:
High shrink-swell potential presents severe maintenance problems for pavement and foundations. The problems include cracking and heaving, and these can result in foundation collapse. Structures or pavement in areas with high shrink-swell potential can be designed to withstand the stress from swelling soils. Any development in such areas should be constructed to compensate for the problems.

3. UNIFIED CLASS

Map Categories:
1. Not rated
2. GW
3. GP
4. GM
5. GW-GM
6. GC
7. SW
8. SP
9. SP-SM
10. SM
11. SW-SM
12. SC
13. ML
14. ML-CL
15. CL-ML
16. CL
17. MH
18. CH
19. PT

Description:
The Unified Engineering Soil Classification system is one of three systems used to classify soils. In the Unified system, soils are grouped into 15 main classes (GW through PT) and numerous borderline classes (MH-CH) where the soil cannot be designated as one class or another. The Unified system considers soil properties which affect the bearing strength of the soil and the capability of the soil to support roads or foundations. GW is the strongest and PT the weakest. Table 5.3 shows how the three classification systems, American Association of State Highway Officials (AASHO), Unified, and texture, used in this study compare. Unified ratings are assigned to each soil horizon. Horizons below the surface are more important in most evaluations of development potential because most foundations are deeper than 15 inches. Some soils are assigned only one rating (primary), and some are assigned a secondary rating. The primary is the most important.

Table 5.3

GENERAL RELATIONSHIP OF SYSTEMS USED FOR CLASSIFYING SOIL SAMPLES

USDA Texture Class and Symbol	Unified Symbol	AASHO Symbol
Clay; silty clay "c"; "sic"	CH MH CL	A-7 A-7 A-7
Silty clay loam "sicl"	CL ML-CL CH MH	A-7 A-7 A-7 A-7
Clay loam "cl"	CL ML-CL CH MH	A-6 or A-7 A-6 A-7 A-7
Loam "l"	ML-CL CL ML	A-4 A-6 A-4
Silt loam "sil"	ML-CL ML CL	A-4 A-4 A-6
Silt - "si"	ML	A-4
Sandy clay "sc"	CL SC	A-7 A-7
Sandy clay loam "scl"	SC SC CL	A-6 A-2-6 A-6
Sandy loam "sl"	SM SC SM-SC	A-2-4 or A-4 A-2-4 A-2-4
Fine sandy loam "fsl"	SM ML ML-CL SM-SC	A-4 A-4 A-4 A-4
Very fine sandy loam "vfsl"	ML-CL ML	A-4 A-4
Loamy sands "ls"; "lfs" "lvfs"	SM SM-SC SM ML	A-2-4 A-2-4 A-4 A-4
Sand; fine sand "s"; "fs"	SP-SM SM SP	A-3 A-2-4 A-3
Very fine sand "vfs"	SM ML	A-4 A-4
Coarse sand "cs"	SP; GW SP-SM SM SM	A-1 A-1 A-1 A-2-4
Gravel, "G"	GP; GW GM or GC GM of GC GM GC	A-1 A-1 A-2 A-4 A-6

Value:
Unified Class maps should be consulted for any structures where the soil's ability to tolerate a heavy load is a consideration. It is a good reference when looking for potential industrial sites, which usually involve heavy structures or equipment and require a strong foundation. Bearing strength problems can be rectified, but at some expense to the developer. For instance, with organic soil (PT), the soil may have to be removed and more solid foundation material substituted for the unstable, weak organic soil.

4. AASHO CLASS

Map Categories:
1. Not rated
2. A-1
3. A-2
4. A-3
5. A-4
6. A-5
7. A-6
8. A-7

Description:
Like Unified Class, AASHO is an engineering classification system. The AASHO rating system classifies soil according to the properties that affect highway construction and maintenance. There are seven AASHO groups ranging from A-1 to A-7; A-1 soils present the fewest problems. AASHO ratings are assigned by horizon, and like Unified, the horizons below the surface are most important. The AASHO system also assigns primary and secondary ratings to each soil series.

Value:
AASHO ratings are aimed specifically at highways and roads and the ratings should be consulted when evaluating such development. Poor AASHO ratings (A-6, A-7) indicate that there will be road maintenance problems unless special construction techniques are used.

5. CORROSION POTENTIAL STEEL/CONCRETE

Map Categories:
1. Not rated
2. Very low
3. Low
4. Low-Moderate
5. Moderate
6. Moderate-High
7. High
8. Very high
9. Variable

Description:
Corrosion potential is a measure of soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Corrosion potential ratings are assigned by horizon, and range from low to high.

Value:
Steel and concrete in highly corrosive soils should be treated to protect them from damage. While corrosion potential can present development problems for utility lines or foundations, they can be easily corrected by selecting the proper construction materials.

6. PERMEABILITY

Map Categories (inches per hour):
1. Not rated
2. Very slow (< 0.06)
3. Slow (0.06-0.2)
4. Moderately slow (0.2-0.63)
5. Moderate (0.63-2.0)
6. Moderately rapid (2.0-6.0)
7. Rapid (6.0-20.0)
8. Very rapid (> 20.0)
9. Variable

Description:
Soil permeability is the quality of the soil that enables it to transmit water and air. Permeability is usually given as a rate of flow of water downward through the soil. Rates range from less than .06 inches per hour (very slow) to greater than 20 inches per hour (very rapid). Permeability is rated by horizon, the lower horizons are generally the most important.

Value:
Permeability is a critical factor in evaluating whether septic tanks will function properly. If the permeability is very slow, the sewage effluent will not move through the soil. If the permeability is very rapid, the effluent may move too fast to be decontaminated before reaching ground water supplies. Septic tank problems relating to slow permeability can be improved somewhat by regulating lot-size to prevent over-saturation and surface wetness. Also, greater investments can be made in the construction of septic systems to compensate for permeability problems. With slowly permeable soils, gravel can be used as a base or mounds can be constructed; in soil with rapid permeability, clay can be used as a base.

7. TEXTURE (AND TEXTURE MODIFIER)

Map Categories:
1. Not rated
2. Silty clay
3. Silty clay loam
4. Clay loam
5. Shaly silty clay loam
6. Loam
7. Silt loam
8. Fine sandy loam
9. Sandy loam
10. Loamy fine sand
11. Fine sand
12. Sand
13. Coarse sand
14. Sand and Gravel
15. Loamy gravel
16. Muck
17. Silty clay shale
18. Shale
19. Siltstone

Description:
The USDA textural classification system is based upon soil particle size. As with the Unified and AASHO systems, ratings are assigned by horizon, and secondary as well as primary ratings are often given. Texture modifiers (which indicate that particles larger than 2.0 mm are present) may be assigned to a soil. The modifer defines the nature of these particles, such as gravelly, or cobbly.

Texture class can be used as a measure of bearing strength as can Unified and AASHO classes (Table 5.3). Generally, coarse textured soil with high sand and gravel content is better drained and has a higher bearing strength than fine textured soil (clay). While some coarse material is desirable, extremely coarse soils are erodible, allow water to drain too rapidly, and present development problems as difficult as soil with very fine texture. Fine textured soils inhibit drainage and have low bearing strength. Extremely fine textured organic soils should be removed before development or reserved for specificed agricultural uses.

Value:

The occurrence of sand and gravel or bedrock in the lower horizons is stored in the texture information, including bedrock type. The location of sand and gravel or particular types of bedrock can be important in evaluating suitability for septic tanks, utility installation, and foundations. As sand and gravel and certain types of bedrock are also valuable mineral resources, this texture information can also be useful in determining the location and extent of potential quarrying sites. Surface texture is important in evaluating recreation potential where surface soils are subject to heavy use (Table 5.2) and in rating agricultural potential.

8. AVAILABLE WATER CAPACITY

Map Categories: (inches of water per 60" of soil):

1. Not rated
2. < 4.0
3. 4.0-5.9
4. 6.0-6.9
5. 7.0-7.9
6. 8.0-9.9
7. > 10.0

Description:

Available water capacity is the ability of soils to hold water for use by most plants. Ratings are given as a range of inches of water per inch of soil, such as .06-.10 inches per inch. Ratings are assigned to each horizon, but the ratings are not meaningful unless some calculation is made of the total number of inches available in each soil. The information that is stored and mapped in the external file is the total number of inches available over the whole soil profile. Ratings range from less than 4 inches to greater than 10.

Value:

Available water capacity should not be confused with ground water availability. Available water capacity is most useful in evaluating agricultural potential and locating droughty soils which are very limited for crop production and maintenance of vegetative cover.

C - Land Use

Map Categories:

1. Residential
2. Commercial
3. Mixed Urban & Other Built Up Land
4. Agriculture: Cropland, Pasture
5. Vineyards, Orchards, Nurseries
6. Other Agricultural Lands
7. Forest: Deciduous
8. Evergreen
9. Shrub & Brush
10. Recreation : Golf Courses
11. Parks
12. Beaches
13. Drive-In-Movie, Race Track, Marinas
14. Other Recreational Areas
15. Industry: Power Plant (Electric)
16. Junkyards
17. Electric Substations & Right-Of-Way
18. Gas
19. Water Treatment Plant
20. Sewer
21. Industry ("plus" commercial complex)
22. Institutions: Schools
23. Churches
24. Cemeteries
25. Other
26. Transportation: Seaport
27. Airport
28. Railroads
29. Roads - Highways
30. Streams
31. Lakes
32. Reservoirs
33. Forested & Nonforested Wetlands
34. Barren (including Quarries, Borrow, Pits, Gravel pits)
35. Other - Landfills & Water Control

Description:

As the name implies, a land use map shows how the land has been developed or is being used. It may also describe generally the vegetative cover where building or farming has not occurred. Land use maps may be included in an OCAP study for several periods of time, including maps which project future land use.

Data Gathering:

If land use maps are not available for an OCAP study area, the Remote Sensing Unit in the Resource Analysis Section can gather the land use information. Several survey methods can be used: walking throughout the study area and compiling the land use information, driving through the area and doing a "windshield" survey, flying aerial photography and intepreting it, using satellite imagery, or combining any or all of these. The first two are very time-consuming, although they may be the most accurate. Satellite imagery is fast, but inaccurate. Aerial photography, combined with some field checking (walking or driving), is the alternative used by the Remote Sensing Unit.

Aerial photography can be flown and interpreted more rapidly than field surveying, and it can be interpreted with a high degree of accuracy, although it is not perfect. For instance, if a house is used for something other than a residence, such as a gift shop, it still looks like a house from the photography and will be classified as residential. Problems such as this are minor and can be easily corrected with your help. If you work with the Remote Sensing and OCAP staff people, misclassifications can be caught and corrected. Further information about the Remote Sensing Unit and the land use classification scheme they use is included in Appendix III.

Value:

Land use is an important element in most OCAP studies. It can be used in a variety of ways:

1. to differentiate between land that is already developed and land that is not;
2. to check for incompatability between existing and proposed development;
3. to compare with zoning or land use plan maps to determine the validity of the boundaries;
4. to compare land use trends over several years (if more than one year's worth of data exists); and
5. to evaluate erosion and run-off potential.

Once the land use maps are in the computer, it is very easy to make corrections and produce up-to-date maps. This is not true if land use maps must be redrafted every time changes are made. The land use information can be helpful when analyzing areas of development potential in the several ways mentioned above. First, most future development is aimed at undeveloped areas which the land use map can pinpoint. Second, the land use map can identify areas that would be unfit for certain types of development because of proximity to an incompatable use. You would not want a subdivision downwind from heavy industry or a feed lot. Third, areas that are zoned or planned for a particular use can be checked. If an area has been zoned industrial for 20 years, and only 5% of it is used for industry, perhaps the zoning should be revised.

Land use maps are also helpful in analyzing trends if the information is put into the computer for several periods of time. Finally, the maps can be used with soil and slope maps to evaluate erosion and run-off problems. Areas with a high erosion potential may, in fact, have little erosion if they are tree covered. Similarly, bare areas with a low erosion potential can be a problem. Land use can further refine the erosion potential map described earlier.

Two additional maps are based on land use designations, the land use plan map and the zoning map. These maps may become part of the OCAP data base for the reasons suggested.

1. LAND USE PLAN

Map Categories:

1. Residential
2. Commercial
3. Industrial
4. Public
5. Rural
6. Open Space

Data Gathering:

The map showing the planned land use for an area must come from the county or other area with which the OCAP staff is working.

Description:

The land use plan for an area shows the way that the community would ideally want to develop, and it should be the basis for the zoning map. It is usually a generalized representation of existing and projected land use.

Value:

A major reason for including the land use plan in the OCAP data base is to compare the projected land use with environmental problem areas to judge whether the plan is realistic. You would not want to plan for residential development in areas unsuited for it. Further discussion of evaluation procedures are in Section VII.

2. ZONING

Map Categories:

1. One or two family (more than 2DU/acre)
2. One or two family (2 or less DU/acre)
3. Multifamily
4. Public
5. Retail Business
6. Industry
7. Office Commerical

Data Gathering:

Zoning maps must come from the county or area with which the OCAP staff is working.

Description:

Zoning maps describe the planned land use and density that a community has chosen through a zoning ordinance for its land.

Value:

Zoning maps are used in conjunction with land use or evaluation maps to judge the adequacy of the zoning designation. One such use was noted in the description of land use. Zoning may also be used with the evaluations of development problems that are described in the next section. If an area is zoned industrial, but shows severe problems for industrial development, the zoning should, perhaps, be reconsidered.

D - Geology

1. BEDROCK GEOLOGY

Map Categories:

1. Sandstone

2. Limestone
3. Shale
4. Dolomite
5. Coal

Description:

A bedrock geology map shows the types of bedrock (rocks having similar mineral composition and other characteristics) that are present either at the surface or below it at some depth. This map delineates the areas where sandstone, limestone, dolomite, shale, coal, or other types of bedrock occur and notes for the reader vertical or stratigraphic sequence in which they occur.

Data Gathering:

Bedrock geology maps are compiled by a combination of different methods. First, field work must be done to determine what type of rocks occur at the surface of the area being studied, what characteristics each of these rocks possess, in what sequence they occur, and where, areally, they are found. This may be done by studying roadcuts, rock sequences in quarries, stream valley walls or other features where rock may be exposed. Where bedrock is buried at depth, water well or oil and gas well logs and cores may be studied to determine the same information. A bedrock geology map reflects the results of these studies.

Value:

In any area, the type of bedrock present greatly influences the use of the land. Use of the bedrock as a building foundation or as a mineral resource requires distinction of the different rock units present. Bedrock type may also be a determining factor in the siting of sanitary landfills or sewage lagoons, and in the location of homes requiring septic tanks. The availability of ground water in many areas also depends on the type of bedrock present and on that bedrock's physical characteristics.

Not all types of bedrock can provide as sound a foundation as may be desired for large structures such as factories, department stores, high-rise buildings, grain elevators, bridges, and dams. Some rock, such as limestone or dolomite, is subject to a possible weakness. Because limestone and dolomote are, chemically, carbonate rocks, they are slowly soluble in the weak acids contained in ground water. Over the years, natural solution may have produced small openings along the levels of the more soluble layers. In most cases, these solution cavities are small, but they are so abundant and so well connected in certain zones in the rock that water can move through them and collect with ease. This makes the limestone or dolomite a good source of ground water, but where solution cavities have been sufficiently enlarged by additional solution, the rock becomes weak, making it a poor foundation. As this condition is difficult to predict in many cases, it is suggested that test drilling be done before any major construction is undertaken in areas where bedrock is limestone or dolomite.

Shale, a much weaker foundation than either solution-weakened limestone or dolomite because of its clayey, noncrystalline nature, may be additionally weakened by systems of small natural cracks which run through it parallel to bedding planes. Professional engineering advice should be sought before shale is used as a base for any building, particularly if the building is to be located on even a slight slope.

The best foundations for large structures in Ohio are on sandstone or on limestone or dolomite which has not been weakened by solution. These rock types generally provide excellent foundation strength, and they occur in abundance throughout the state.

As previously mentioned, limestone and dolomite are often excellent sources of ground water because of their highly soluble nature. In addition, sandstone may be an important ground water source where it is highly porous and permeable, or where it may be fractured. Shale, which is too fine grained to be very permeable, is usually a poor source of ground water. In addition, water found in shale is generally very highly mineralized, often containing iron or sulfur, two very undesirable additions to water.

In areas where no ground water availability maps have been created, a bedrock geology map can provide a very rough guide to where ground water may be available by showing where each type of bedrock occurs. This information, however, should not be relied upon in the same manner as a ground water map.

Determining the type of rock beneath the surface in planning the location of a sanitary landfill, sewage lagoon, or septic-tank system is important from the standpoint of protecting those rock types which bear ground water from contamination by landfill leachate or liquid wastes from sewage lagoons or septic tanks. Areas where sandstone or limestone or dolomite occur at relatively shallow depths beneath the surface should be avoided. Indeed, such areas are protected by Ohio Environmental Protection Agency and Ohio Department of Health regulations. Areas where bedrock is shale are better suited to development of waste-disposal facilities because shale, with its low permeability, acts as somewhat of a retaining and filtering agent for liquid contaminants, and because shale is not an important source of ground water.

2. DEPTH TO BEDROCK (DRIFT THICKNESS)

Map Categories:

1. 0-10 feet
2. 10-20 feet
3. 20-30 feet
4. 30-40 feet
5. 40-50 feet
6. 50-100 feet
7. > 100 feet

Description:

A depth to bedrock or drift thickness map illustrates either the depth beneath the surface at which bedrock lies or the thickness of the glacial cover (drift) over bedrock. Both maps convey essentially the same information, which is how much unconsolidated surface material is encountered before bedrock is reached. The maps show areas where the thickness of unconsolidated material or the depth to bedrock is within stated ranges. These ranges in thickness reflect the degree of accuracy of the available data.

Data Gathering:

Depth to bedrock or drift thickness maps are prepared primarily from records of water wells. Well logs, on file at the ODNR, Division of Water, are first field located and plotted on topographic maps and then studied to determine how deep bedrock was encountered in drilling. The information is broken down into ranges of depth to bedrock (or drift thickness). This type of map can also be prepared by using some type of percussion apparatus to create shock waves in the surficial material which are detected by a portable seismograph. Reflections of the shock waves off of the bedrock surface and the time of travel of the waves are

recorded, and this record is translated by a geologist into depth to rock information.

Value:

It is important to know the depth to bedrock for several reasons. Where bedrock is shallow (i.e., less than 8-10 feet), it provides an excellent, solid base for the foundations of large structures, assuming the bedrock type is suitable for foundation development. Industries, office buildings, shopping malls, high-rise buildings, grain elevators, bridges and dams all must have the sound foundation afforded by bedrock. Such structures may go as deep as 40-50 feet for foundation support, depending on the area of the foundation. Where bedrock is deeper than is economically feasible to reach directly, pilings are driven to the bedrock for support. In areas where rock is very deep, development must contend with a foundation in whatever unconsolidated material happens to be at the surface.

Perhaps just as importantly, areas where bedrock is shallow provide places where the bedrock may be economically extracted by quarrying. If the bedrock happens to be coal, high-quality limestone or dolomite, sandstone, salt, gypsum, or even shale, it may have great value as a mineral resource. It should be noted that areas of shallow bedrock can accommodate either quarrying or a structure, but not both, making a choice between development and mineral extraction necessary.

Shallow bedrock can, on the other hand, present several potential problems. Where bedrock is less than eight feet beneath the surface, it may interfere with the installation of basements and excavations for water and sewer lines, greatly increasing construction costs. In addition, shallow bedrock areas may represent areas where ground water supplies are being replenished. Location of homes requiring septic tanks, or location of sanitary landfills or sewage lagoons in these areas would greatly increase the likelihood of ground water contamination. The geologic problem with septic tanks and sanitary landfills is very similar in that septic tank effluent and landfill leachate must be contained above bedrock and ground water supplies. Therefore, the depth to bedrock (or the thickness of surficial material), as well as the character of the material covering the bedrock, is an important factor. Ohio Sanitary Code regulation #HE-29-10, referring to location of septic tank disposal systems, states that such systems should not be constructed in areas where bedrock is less than four feet beneath the bottom of the proposed system (i.e. where bedrock is less than 10-12 feet deep). To be sure no contamination occurs, the depth to rock should really be greater. Thus, residential and small commercial development requiring septic tanks should not be undertaken in shallow bedrock areas. The minimum depth to bedrock or thickness of surface material beneath the botton of a sanitary landfill or a sewage lagoon varies greatly according to various researchers. The Illinois State Geological Survey has set a standard to which many states, including Ohio, now adhere--30 feet of relatively impermeable surface material between the bottom of a landfill or sewage lagoon and bedrock or any other potential source of ground water. In-general, this means a total of approximately 50-60 feet of favorable (impermeable) material would have to be present over bedrock for a landfill to be properly developed (assuming the landfill trench extends to a depth of 20-30 feet), and approximately 35-40 feet of impermeable material would be needed to develop a sewage lagoon.

Depth to bedrock maps, such as the maps provided by OCAP, can show areas where bedrock may be shallow enough to afford a good, strong foundation for large structures, or shallow enough to quarry economically. The maps also show areas where bedrock is deep enough to accommodate excavations for basements and underground utility lines, to provide for the safe and pollution-free operation of septic tanks, or to accommodate sanitary landfills or sewage lagoons.

3. GLACIAL OR SURFICIAL GEOLOGY

Map Categories:

1. Alluvial Deposits
2. Valley-Train Deposits
3. Kames and Eskers
4. End Moraine
5. Ground Moraine
6. Lake Beds

Description:

A glacial or surficial geology map shows the areal distribution of unconsolidated materials which lie above bedrock. These unconsolidated materials are composed primarily of sand, gravel, silt, and clay, and they cover large areas, absent only where bedrock crops out of the surface. A map of glacial or surficial geology differs from a soils map in that it considers all material above bedrock, whereas soil survey information extends to only five feet beneath the surface.

Data Gathering:

Glacial or surficial geology maps are compiled almost entirely from field work conducted by geologists trained to recognize subtleties in landscapes which tell a complex geological story. Roadcuts, stream valley walls, cut banks, and assorted natural and man-made features are studied, topography is analyzed, and auger borings collected. Where supplemental information is needed for correlation purposes, water well logs are studied to determine the character and composition of the unconsolidated material above bedrock, and to aid in the interpretation of what may be a very detailed history of geologic events.

Value:

Since the physical and chemical breakdown, or weathering, of the geologic materials present at the surface produce what we know as soils, a knowledge of these geologic materials is obviously essential to understanding the nature of the soils that have developed and are developing. A map of surficial or glacial geology for agricultural purposes, then, is not unlike a map of soils, for the geologic materials at the surface are the parent materials from which the soils were formed. Hence, much of the discussion appearing in descriptions of the various soil maps and their optimum use in planning and management also applies here and need not be repeated.

Unconsolidated surface materials are evaluated for their suitability as building foundation or septic tank location, for the effectiveness as a sanitary landfill or sewage lagoon site, for their suitability as a source of construction materials, or for their potential as a source of an adequate ground water supply. Suitability is controlled to a great degree by the characteristics and three-dimensional distribution of these materials. Each of the above factors is critical in determining the nature and extent of development that may occur in an area.

Many construction problems and health hazards can be anticipated and avoided if the unconsolidated surface materials are properly evaluated prior to development. As there are many different types and combinations of glacial/surficial geologic material present across the state, only those types with significant potential or with significant problems for development will be mentioned.

Perhaps the most significant surficial material in terms of present and potential use and development is sand and gravel. Sand and gravel deposits, most of which were produced by glacial activity, are excellent sources of both ground water and construction materials. The location and extent of sand and gravel deposits is important in planning the development of any area. Where these deposits contain significant amounts of ground water, they must be protected from contamination by surface sources of pollution, such as sanitary landfills, septic tanks, sewage lagoons, and other means of waste disposal. Where sand and gravel deposits are presently extracted or could be extracted in the future for use as construction aggregate, they must be protected from development or they will be lost.

Another significant surficial material is clay, much of which is also glacially derived. Areas where clay occurs are very poorly suited to residential and other small scale development because clays are very poorly drained, and they have a high moisture-holding capacity. This results in wet basements, standing water in yards in flat or low-lying areas, and in very poorly functioning septic tanks. The installation of leach fields in areas where clay content in surficial materials is high is required by state and county health department regulations to ensure adequate drainage of septic tank effluent. Also, many foundation problems occur in buildings constructed on clay. Many clays, when subjected to excesses of moisture, tend to swell. As they dry out, they shrink, often developing deep cracks. As a result of this, foundations and walls may shift and crack. When these clays occur on a natural slope, alternate swelling and shrinking may cause the clay to move slowly downhill, a process which imposes additional stresses on building foundations and walls. Where areas of clay can be identified, as on a surficial geology map, problems with wetness, septic tanks, and foundation stability can be anticipated, and such areas can be avoided or appropriate measures can be taken to ensure that a minimum of problems arise in the future.

4. GROUND WATER AVAILABILITY

Map Categories:

1. Yields > 1,000 gpm in sand and gravel
2. Yields up to 500 gpm in sand and gravel
3. Yields up to 250 gpm in sand and gravel
4. Yields up to 25 gpm in sand and gravel lenses
5. Yields up to 200 gpm in limestone and dolomite
6. Yields up to 50 gpm in limestone and dolomite
7. Yields from 5-10 gpm in limestone and dolomite
8. Yields up to 25 gpm in sandstone
9. Yields less than 5 gpm in sandstone and shale

Description:

A ground water availability map is intended to show the relative availability of ground water or the average yield that can be expected from properly developed individual wells in any given area. Such a map is a generalization of several complex hydrogeologic factors, and thus provides only a planning guideline. It does not describe the absolute quantities of ground water available and should not be used in place of test drilling.

Data Gathering:

Data gathering in ground water availability is controlled by the distribution, thickness, and character of the geologic units at and to considerable distances below the surface. Because of this, the compilation of a ground water availability map is dependent on knowledge of bedrock geology and glacial or surficial geology. In addition, well logs or water wells drilled previously in the area are consulted to determine their yields and the types and thicknesses of the various geologic materials encountered in drilling. Ground water quality studies (chemical analyses) are also utilized to determine the fitness of the water for its intended use.

Value:

Because of the dependence of many communities and individual homes on ground water as their only water supply, the availability of this resource is of prime concern. In areas without a municipal water supply, the amount of ground water available is of especially great importance. Ground water availability is important in determining the types and densities of future development that may occur, because no community, business, or industry can grow larger than its available water supply will allow. Each land use has its own minimal water requirements. For example, low-density single family residences are adequately supplied by wells yielding as little as five to ten gallons of water per minute, whereas an industry or stock farm may require as much as 100 to 500 gallons per minute or more. In addition, amounts of water in aquifers (water-bearing layers) tapped by increasing numbers of wells or by large wells, can become limited so that deeper drilling, to intersect additional aquifers, may be necessary for future wells.

Perhaps the most significant sources of ground water in Ohio are deposits of sand and gravel. Especially important are those deposits made by meltwater derived from retreating glaciers in the last "ice age". These deposits are generally very thick, confined mostly to today's stream valleys. Some of the best deposits are contained in the valleys of the Mad River, the Great Miami and Little Miami Rivers, the Scioto River, the Hocking River, and the Tuscarawas River. These deposits may yield more than 1,000 gallons of water per minute, making them the most important sources of ground water in the state for municipal and industrial use. In addition to these "outwash" or "valley train" deposits, other glacially derived deposits are important sources of ground water. Much of Stark, Portage, and Summit Counties, for instance, are covered by sand and gravel deposits known as "kames". These deposits, along with others called "eskers", are not confined to stream valleys. Depending on their topographic location, they may produce great quantities of water or they may only produce supplies adequate for residences. These features may also represent areas where deeper ground water aquifers are being replenished or recharged.

Sand and gravel aquifers can also be found in pockets in other, less permeable, glacial deposits known as "till". These lenses of sand and gravel generally yield only small quantities of water, but in most cases are reliable water suppliers.

Of the other ground water aquifers in the state, only limestone and dolomite are of much importance. Limestone and dolomite, because they are susceptible to solution, may have developed in them small cavities through which water can move and collect rather easily. Where very soluble layers occur, ground water may be

available in large quantities (i.e. yields of 100 to 500 gallons per minute may be developed), but even where the limestone or dolomite has been only slightly affected by solution, ground water sufficient for a single home supply may be available. In general, the sandstone found in Ohio is not regarded as a good water supply because it is, in many places, tightly cemented and thus poorly permeable, but in places it may yield up to 25 gallons per minute.

In Ohio, ground water reservoirs have been pumped for years with little drop in the watertable, so that ground water is regarded as a renewable resource. All resources, however, are subject to overuse, and water is no exception. More people, greater demands, pollution of aquifers, and reduced recharge resulting from building on large areas of permeable soil through which water once seeped, all contribute to restricting the availability of ground water. If ground water aquifers are to continue to provide adequate supplies of clean water, care must be taken to ensure that the inflow of water into the aquifer is adequate and not contaminated.

5. FLOOD-PRONE AREAS

Map Categories:

1. Not rated
2. Flood-Prone Areas
3. Other Areas

Description:

Flood-prone area maps are essentially maps which show the extent of areas which have historically had flooding problems. These maps are based on a 100 year recurrence interval, showing areas that have, on the average, a 1 in 100 chance of being inundated in any year. In general the delineated areas are for natural conditions and do not take into consideration degree of urbanization, the possible effects of existing or proposed flood-retention and flood-prevention structures, or channel improvements, except where those effects could be evaluated. Changes such as increased urbanization, including additional paved areas, installation of storm sewers, and construction in the flood-prone area tend to increase the extent and chances of inundation. Changes such as additional flood-retention/prevention structures tend to decrease the extent and chance of flooding downstream of the structures, but tend to increase the extent and chance of flooding upstream. In contrast, channel improvements tend to increase the extent and chance of flooding downstream.

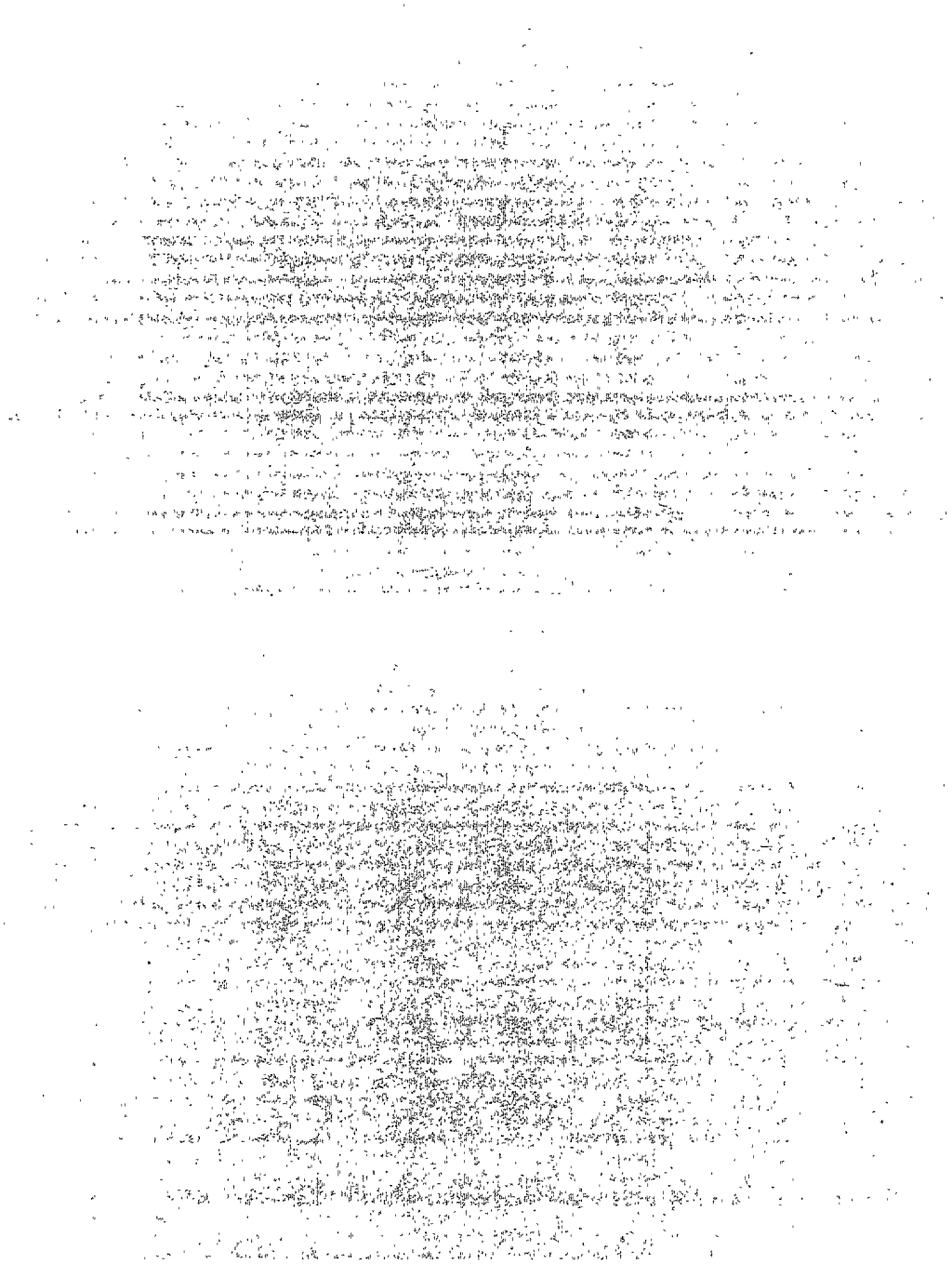
Data Gathering:

Flood-prone area maps are compiled by the U.S. Geological Survey and the U.S. Army Corps of Engineers, who delineate such areas through the use of readily available information on past floods. This information includes flood profiles based on high-water marks and regional stage-frequency relations, but usually does not include detailed field surveys and inspections.

Value:

Because flood-prone area maps identify areas of potential flood hazards, they are important to administrators, planners, engineers, and private citizens concerned with future land developments. Building in flood-prone areas creates the unnecessary hazard of potential flood damage and loss of life. In addition, as buildings on a floodplain may act as partial dams, they add to the flooding problem by increasing the destructive effects of flooding upstream by raising the level of floodwaters. Since there is no meaningful method of preventing floods, emphasis must be placed on preventing development in such flood-prone areas. If flood-prone area maps are consulted before a development is begun, or before zoning regulations or land-use plans are formulated, the risk of incurring flood-related losses is greatly reduced. Where more detailed flood information is required for other purposes, flood hazard reports, available from the U.S. Geological Survey or the U.S. Army Corps of Engineers, should be consulted. The best uses of flood-prone areas are open space, recreation, or agriculture.

appendix B



APPENDIX B

EVALUATION OF SITE EXPOSURE TO RAILWAY NOISE*

The distances in the table below were arrived at with the assumption that there are 10 or more nighttime (10:00 p.m. - 7:00 a.m.) railway operations. If a railway has 10 or more nighttime operations, proceed to Table III for an immediate evaluation of the site's exposure to noise from that railway.

But

if a railway has fewer than 10 nighttime operations, multiply the distance from the site to that railway by the appropriate adjustment factor; then proceed to Table III.

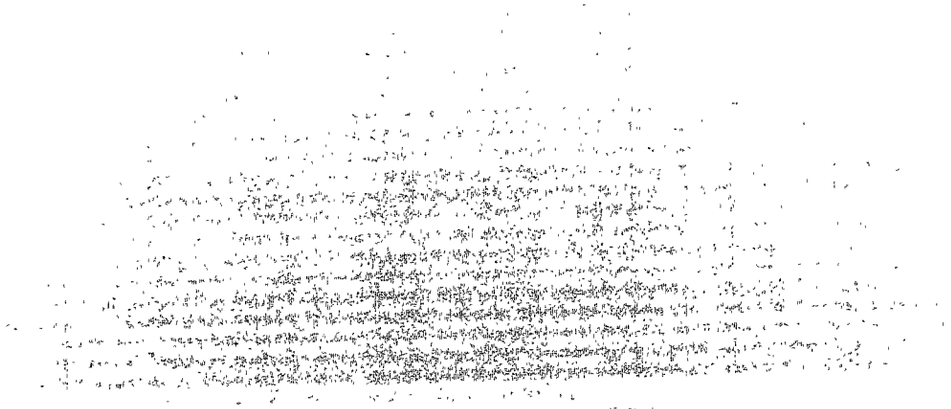
Number of Nighttime Railway Operations	Adjustment Factor
1 - 2 operations	3.3
3 - 5 operations	1.7
6 - 9 operations	1.2

SITE EXPOSURE TO RAILWAY NOISE

Distance from Site to Right-of-Way: (Possibly adjusted for number of nighttime operations)		Acceptability Category
Line-of-Sight Exposure	Shielded Exposure	
More than 3000 ft.	More than 500 ft.	Clearly Acceptable
Between 601 and 3000 ft.	Between 101 and 500 ft.	Normally Acceptable
Between 101 and 600 ft.	Between 51 and 100 ft.	Normally Unacceptable
Less than 100 ft.	Less than 50 ft.	Clearly Unacceptable

*Source: "Noise Assessment Guidelines," U.S. Dept. of HUD, BBN Report No. 2176, August, 1971.

appendix C



APPENDIX C

- Township Meeting Notices
- Meeting Outlines
- Mailing List for Meetings

JERUSALEM TOWNSHIP TRUSTEE MEETING

AUGUST 20, 1979

1. Show what I've been doing
   - Background research
   - OCAP
     - System
     - Modifications
     - Combining with LUAS
2. Set-up meeting with township residents.

   Meeting will explain: Land Use Planning,
   Why need,
   What Co. doing.

   Show examples of what has been happening in Township last few years, at Res. Meeting.

   Information I would like to get out of Res. Meeting is:
   - What good & bad things have been happening in Township.
   - What you'd like to see changed, improved, eliminated.
   - What goals would you like the Township to work toward.
   - (Need cross-section of residents)
     get names of groups or residents that would be interested in participating. Need a group that would continue through all meetings.
   - Set tentative date for 1st. meeting (I will come to next Zoning Board Meeting to explain agenda).
   - Write a letter, to be signed by Trustee, explaining that a land use plan is being done and would like to meet with residents to get their ideas. To be sent 2-weeks prior to meeting date.

JERUSALEM TOWNSHIP
BOARD OF TRUSTEES
CURTICE, OHIO--43412

Meeting: Jerusalem Twp. Trustees
Time: 7:30 p.m.
Place: Jerusalem Twp. Hall
Date: Thursday, October 4, 1979

Dear Resident:

For the past several months the staff of the Toledo-Lucas County Plan Commissions have been gathering background information for the preparation of a Land Use Plan for Jerusalem Township. This plan will help us to determine a logical and orderly growth pattern for our Township.

We feel that your opinions on Township matters are important. For this reason, and your knowledge and concern for the area, you are being asked to attend a meeting on October 4th with Township officials and the Toledo-Lucas County Plan Commissions.

The purpose of this meeting is to discuss how you would like to see the Township develop. Your input as to how land should be used, existing problems and desirable future development, will be valuable in helping us to meet your needs as residents of Jerusalem Township. It is our hope that you will plan on attending.

Sincerely yours,

Raymond Perry, Chairman
Jerusalem Township Trustee

John Henning
Jerusalem Township Trustee

Richard Smarkel
Jerusalem Township Trustee

RP:tf

MEETING AGENDA - JERUSALEM TOWNSHIP TRUSTEES

DATE: OCTOBER 4, 1979

TIME: 7:30 P.M. to 9:30 P.M.

PLACE: JERUSALEM TOWNSHIP HALL

The purpose of this meeting is to find out how you feel the land in the Township should be used, now and in the future.

7:30 P.M. Introduction by Jerusalem Township Trustees.

7:40 P.M. LISTING OF YOUR IDEAS AND SUGGESTIONS on how the land in Jerusalem Township should be used (developed, changed or kept the same).

7:50 P.M. DISCUSSION OF IDEAS AND SUGGESTIONS. At this time the person who suggested the idea is given the opportunity to clarify or explain the idea. Others can add their support or objections at this time.

8:20 P.M. PRELIMINARY VOTING. Review all the ideas and suggestions listed by the group and choose the ten (10) you feel are the most important.

Everyones answers will then be added together to determine the top ten (10) problems as seen by the group as a whole.

8:30 P.M. DISCUSSION OF TOP TEN PROBLEMS. Any additional comments or questions on these problems can be raised at this time.

9:00 P.M. FINAL VOTE AND RANKING OF PROBLEMS. Rate the groups top ten problems by giving the most critical problem a "10", the next a "9" (etc.), with the least critical problem receiving a "1". These points are then totaled for each problem.

GUIDELINES FOR EVALUATING CHANGES IN LAND USE

The following are guidelines to help you when looking at changes that have occurred in Jerusalem Township over the past few years.

Ask yourself:

*What changes have taken place?
*Have these changes been for the good of the Township?
*What do you feel should have been done (instead of, in addition to, etc.)?
*What would you like to see in the future, as to how the land will be used?

For example, what changes have there been in your area? Have there been:

*new housing (single homes);
*subdivisions;
*additional business;
*farm expansion;
*proposed development, not yet started (subdivisions, parks, etc.);

or losses of:

*farmlands;
*woodlands, parks;
*houses;
*business;
*other changes you know of.

Rev. George Freeland
Clubhouse Blvd.
Curtice, Ohio--43412

Mr. Billy Miller
Jerusalem Twp. Zoning Insp.
Rte. #2 - Box 59-B
Curtice, Ohio--43412

St. Lukes Lutheran Church
20 S. Yondota Rd.
Curtice, Ohio--43412

Mr. Maynard Knitz, Co-Chairman
Jerusalem Twp. Zoning Comm.
Rte. #1 - Cedar Pt. Road
Oregon, Ohio

Mailing list for the
October 4,1979 Meeting

Our Lady of Mt. Carmel
825 Water St.
Martin, Ohio--43444

Mr. Charles Davis

Rt. #1 - 128 Lagoon Dr.
Curtice, Ohio--43412

Chief Joe Verb
Jerusalem Twp. Fire Department
Rte. 1 - Cousino Rd.
Curtice, Ohio--43412

Mr. William Carstensen
Jerusalem Twp. Zoning Comm.
Rt. 1 - Veler Rd.
Martin, Ohio--43444

Jack's Supperette
Howard Rd.
Curtice, Ohio--43412

Edwin E. Stevenson
Rt. #1 - Reuben St.
Curtice, Ohio--43412

Men's Democrat Club
c/o Richard Smarkel
Rte. 4 - State Rte. #2
Curtice, Ohio--43412

John J. Studneski, Jr.
469 Brown Rd.
Curtice, Ohio--43412

Women's Democrat Club
c/o Marge Nirschl
Bunting Road
Curtice, Ohio--43412

Robert E. Anderson
9501 Brown Rd.
Curtice, Ohio--43412

Men & Women's Democrat Club
John Henning
1664 Cedar Brown Rd.
Curtice, Ohio--43412

John A. McGrady
208 Lucas St.
Curtice, Ohio--43412

Raymond Perry, Chairman
Jerusalem Twp. Trustees
Rte. 1 - Yondota Rd.
Curtice, Ohio--43412

Frank Wolf
Rt. #1 - Corduroy Rd.
Oregon, Ohio

Jerusalem Twp. Civic & Improvement League
c/o Elmer Seimet
Rte. #1 - Greenwood St.
Martin, Ohio--43444

Daniel Warner
Rt. #1 - 145 Lagoon Dr.
Curtice, Ohio--43412

Mrs. Joan Schable, Clerk
Jerusalem Township
Rte. 1 - Van Dyke Rd.
Curtice, Ohio--43412

TAKE TO TOWNSHIP MEETING:

-hand outs	-calculator
-maps	-dictionary
-flip chart	-tape
-pencils	

7:15 - SET UP MEETING ROOM

Talk to Township Trustees. Have them explain that we are doing Land Use Plan for Township. Have them keep meeting on track.

7:30 - INTRODUCTION BY TOWNSHIP TRUSTEES

Anne - Welcome People
- Explain purpose of meeting, that it's "problem-minded" not "solution-minded."
- One of a series of Township meetings on the Land Use Planning Process
- Sorry if not everyone received notice. List in back, please put name, mailing address if you wish to receive notice of other meetings.
- John will talk about Land Use Planning in County.

John - What's being done in County
- How it involves Jerusalem
- What we're doing in Township

7:40 - Anne: Start group process
- give purpose again and "Statement of Task."
- clarify by explaining the kind of responses wanted. (DO NOT BIAS GROUP!! Resist further explanations)
- hand out "idea" worksheet

7:50 - List ideas on chart
Then: each person explains their suggestions

8:20 - PRELIMINARY VOTING
- Hand out "Preliminary Voting Worksheet"
- Pick the ten you feel are the most important

8:30 - Turn in Preliminary Voting Worksheets
- Take break while we add up results

8:40 - Discussion of 10 problems
- raise only questions or comments at this time

9:00 - FINAL VOTE
- turn in all sheets

? - CONCLUSION
- Information was obtained in this meeting to more clearly understand Land Use problems in Jerusalem Township

- Thank you for coming

IDEA GENERATION WORKSHEET

You have been provided with the question:

"How do you feel the land in Jerusalem Township should be used, now and in the future."

Please write down (in brief form) your ideas or suggestions. List 1, 2 or 3 suggestions that you think are important and why.

* Your first idea or suggestion: _____

_____

Why important: _____

_____

_____

* Your second idea or suggestion: _____

Why important: _____

_____

_____

* Your third idea or suggestion: _____

Why important: _____

_____

_____

NOTE: You will be asked to report out your ideas for each problem. If someone has given your first idea, go to your second. After all ideas are recorded, you will be given a chance to explain yours.

PRELIMINARY VOTING WORKSHEET

You will now be asked to list in silence the ten (10) problems you feel are the most important. Please list in the space below:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

NOTE: Everyone's answers will then be tallied to determine the ten (10) most important problems, as seen by the group as a whole. At this time, any additional comments or questions can be raised.

FINAL VOTING WORKSHEET

You will now be asked to vote on the importance of each of the ten (10) problems that were picked by the group. Please list each below and rank according to their order of importance ("10" being the most important, "9" the next. . . . with the least important problem receiving a "1".)

Problem	Rank
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	

Eileen Rex
Rte. #1 - Box 203
Curtice, Ohio--43412

Arthur H. Rex
Rt. 1 - Box 203
Curtice, Ohio

C. B. Truman
Rt. 1
Martin, Ohio--43445

Lyle Romstadt
Rt. 1
Curtice, Ohio--43412

George W. Freeland
R.R. 1 - Box 150
Curtice, Ohio--43412

C. M. Seimit
R.R. 1
Martin, Ohio--43445

Betty Witty
Rt. 1
Curtice, Ohio

Nola Gilljland
Rt. #2 - Box 129-G
Curtice, Ohio--43412

Dennis E. Pfiffer
129-F Turnau Rd.
Curtice, Ohio--43412

Robert E. Anderson
9501 Brown Rd.
Curtice, Ohio--43412

Don Mulinix
R.2 - Box 36
Curtice, Ohio--43412

Helen Mulinix
R.2 - Box 36
Curtice, Ohio

John J. Studniski
Rt. 1
469 Brown Rd.
Curtice, Ohio--43412

Billy M. Miller
Rt. #2 - Box 59-B '
Curtice, Ohio--43412

Edwin Stevenson
Rt. #1 - Box 187
Curtice, Ohio--43412

Floyd A. Refft
Rt. #1 - Box 390
Curtice, Ohio--43412

Frank B. Fuss
624 Temple Rd.
Curtice, Ohio

Walton A. Wolf
10420 Jerusalem
Curtice, Ohio

Joel S. Vargo
Rt. 2 - Box 40
Curtice, Ohio--43412

Herman G. Brandt
934 Main St.
Martin (Bono) Ohio--43445

Raymond Perry
4355 Yondota Rd.-Rte. 1
Curtice, Ohio

Mrs. Dale Krener
10522 Jerusalem Rd.
Curtice, Ohio--43412

Mrs. Hazel Peth
11217 Veler Rd.
Martin, Ohio--43445

Frances B. Gray
950 Main St. - RR 1
Martin, Ohio--43445

Persons who attended the

October 4, 1979 meeting

Joan Schabel
Rte. #1
Curtice, Ohio--43412

William Carstensen
Veler Rd.
Martin, Ohio--43445

James T. Perry
RFD. #1 - Box 44
Curtice, Ohio--43412

Dave Fike
Box 211 - Sta. A
Toledo, Ohio

Dick Fleitz
4339 Eastway
Toledo, Ohio--43612

R. W. Boothby
543 Walden
Toledo, Ohio--43605

Alice Spinn
244 LaFountain Dr.
Curtice, Ohio

Frances Sekinger
217 East Ave. - Rt. 1
Curtice, Ohio

Ruth Peth
11217 Veler Rd. - R.#1
Martin, Ohio--43445

Mildred P. Logan
10040 Jerusalem
Curtice, Ohio

Charles L. Davis
128 Lagoon
Curtice, Ohio

Anna Mae Davis
128 Lagoon Dr.-Rt. 1
Curtice, Ohio--43412

Sam Boardman
R.F.D. #2--Box 38
Curtice, Ohio--43412

Norman J. Turner
RFD. 1 - Box 128
Curtice, Ohio--43412

Fred Bruce
R.2 - Box 31
Curtice, Ohio--43412

Alton Lambert
Rt. 2 - Box 41F
Curtice, Ohio--43412

Mr. & Mrs. George Coker
709 Teachout Rd.
Curtice, Ohio--43412

Mr. & Mrs. Don Wright
641 Teachout Rd.
Curtice, Ohio--43412

Steve Connor
RR. #1
Curtice, Ohio--43412

John J. Dyers
11504 Van Dyke Rd.
Curtice, Ohio--43412

Donna Gomoll
958 No. Curtice Rd.
Oregon, Ohio--43618

Robert W. St. John
85-A Park Colony
Curtice, Ohio

William R. Corbin
847 Park Colony
Curtice, Ohio

Ralston Reau
Box 188 - Route 1
Curtice, Ohio

Esther Reau
Box 188 - Route 1
Curtice, Ohio

Harold Habegger
Route 2
Curtice, Ohio

Barbara Szilaggo
Box 65 - Rte. 2
Curtice, Ohio

Louis Szilaggo
Box 65 - Rte. 2
Curtice, Ohio

Mr. & Mrs. John Sekinger
77 West St. - Box 203 - Rt.#1
Curtice, Ohio--43412

Mr. & Mrs. Dan Warner
145 Lagoon Dr.
Curtice, Ohio--43412

Mrs. John M. Nowak
805 Parkmore - Rt. 1 #84
Curtice, Ohio--43412

John Felker
11992 Van Dyke Rd.
Curtice, Ohio

Goldie M. Schabel
89 North St. - Rt. 1
Curtice, Ohio--43412

TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

415 NORTH ST. CLAIR STREET • TOLEDO, OHIO 43604
WALTER T. EDELEN, A.I.P.
EXECUTIVE DIRECTOR

October 15, 1979

Mr. Raymond Perry, Chairman
Jerusalem Twp. Trustees
Rte. 1, Yondota Rd.
Curtice, Ohio--43412

Dear Mr. Perry:

The results of the October 4, 1979 meeting held in Jerusalem Township are as follows, in their order of importance:

#1. Save farmland, preserve rural character
#2. Update Township zoning resolution
#3. Maintain drainage ditches
#4. Provide better police protection, security, in community
#5. Do not want multi-family (apts.)
#6. Clean-up junk cars
#7. Do not want public sewer or water
#8. Enforce existing zoning and building codes
#9. Allow single family development (subdivisions and single lot)
#10. Provide for an ecological balance between farm land, development and natural areas (waterways, woods)

These comments, as well as others discussed, (see attached for a complete listing) will be summarized at the next meeting on the "Jerusalem Township Land Use Plan." I will be contacting you shortly to arrange the time and date.

Thank you for your cooperation in making the meeting a success.

Sincerely yours,

Anne Spelman

Anne M. Spelman,
Assistant Planner

AMS:tf
Enc.
cc: M. R. Forkapa, Administrator
Lucas County Commissioners' Office
Mr. Maynard Knitz, Co-Chairman
Jerusalem Twp. Zoning Comm.
Mr. Charles Davis, Co-Chairman
Jerusalem Twp. Zoning Comm.
Mrs. Joan Schable, Clerk
Jerusalem Township
Mr. Michael L. Adams,
Ohio CEIP Coordinator
Mr. Billy Miller
Jerusalem Twp. Zoning Inspector

RESULTS OF THE OCTOBER 4, 1979, JERUSALEM TOWNSHIP MEETING.

Comment	Rank	% of Total Votes
Save farmland, preserve rural chracter	1	14.4
Update Township zoning resolution	2	11.3
Maintain drainage ditches	3	7.6
Provide better police protection, security, in community	4	7.0
Do not want multi-family (apts.)	5	6.6
Clean-up junk cars	6	5.2
Do not want public sewer or water	7	4.4
Enforce existing zoning and building codes	8	4.0
Allow single family development (subdivisions and single lot)	9	3.8
Provide for an ecological balance between farm land, development and natural areas (waterways, woods)	10	3.6
Provide recreational facilities for children	11	3.3
Limit Federal and State ownership	12	3.0
Cut weeds on vacant lots	13	2.9
One and five acre lots are wasteful	14	2.6
Want orderly planned development	15	2.5
Allow development in established areas (ex. Reno Beach)	16	2.3
Select areas for development not good for farming	17	2.2
Do not want junk yards	17	2.2
Do not want land fills	18	1.7
Do not want trailer courts	19	1.5
Encourage planned business development, small shopping centers	20	1.5
Need retired (elderly) housing development	21	1.1
Stop, clean-up refuse dumping	22	1.1
Clarify flood plain areas and problems	23	1.0
Standarized application of Land Use Controls	24	.9
Fix roads (Lagoon Dr.)	24	.9
Want a stronger local voice	25	.5
Encourage water and sewer extension	26	.3
Recognize and try to resolve the conflict which exist between farm land and single family development	27	.25
Need sanitation and treatment controls, self-contained systems in developments and alternate designs	28	.2
Regulate pond development	29	.1
Increase tax base	30	.05

NOVEMBER 19, 1979

A G E N D A

JERUSALEM TOWNSHIP TRUSTEES

1. Oct. 4 Meeting With Residents

   - Results

2. Goals & Objectives

   - Explain what they are
   - How they work

   (Are overall idea of how you want twp. to develop.)

3. Set Next Twp. General Meeting on Land Use Plan
   (Mid December)

   Agenda - Will go over results of Oct. meeting
   - Explain which will be addressed in plan, which are responsiblity of other agencies
   - Review background maps, information

4. Zoning Update

   - Outline
   - Need letter of support

TOLEDO-LUCAS COUNTY PLAN COMMISSIONS

415 NORTH ST. CLAIR STREET • TOLEDO, OHIO 43604
WALTER T. EDELEN, A.I.C.P.
EXECUTIVE DIRECTOR

MEETING: JERUSALEM TOWNSHIP OFFICIALS AND THE TOLEDO-LUCAS COUNTY PLAN COMMISSIONS
TIME: 7:00 P.M.
PLACE: JERUSALEM TOWNSHIP HALL
DATE: THURSDAY, JANUARY 3, 1980

Dear Resident:

A meeting will be held on January 3, 1980 in the Jerusalem Township Hall to explain and discuss the background information use for the Jerusalem Township Land Use Plan.

Sharon Adams and David Neilsen from the Ohio Department of Natural Resources will be on hand to explain the Ohio Capability Analysis Program (OCAP), a computer system use to map the following information for Jerusalem Township:

1. Prime Agricultural Lands Map
2. Limitations - Seasonal Recreation Map
3. Limitations on Small Scale Development Map
4. Limitations for Large Scale Development Map
5. Composite Limitation Map
6. Septic System Suitability Map
7. Flooding Potential

If you have an interest in the background information used for the Land Use Plan, it is our hope that you will attend this meeting. Additional meetings will be held in the near future to discuss alternative Land Use Plans.

Thank you for your continued support of the Jerusalem Township planning effort.

Sincerely yours,

Anne Spelman

Anne Spelman,
Assistant Planner

AS:tf

appendix D

APPENDIX D

JERUSALEM TOWNSHIP POPULATION PROJECTIONS

CURRENT DATA

DATA BASE: Population projections based on 1975 Toledo-Lucas County population estimate of 13,636.

The Toledo-Lucas County Plan Commissions formally adopted a population policy on February 17, 1977. This policy is to be used in all Plan Commission reports and reads as follows:

> WHEREAS, the rate of growth of the City of Toledo has been declining since 1950, and
>
> WHEREAS, the total population of Toledo has been declining since 1970, and
>
> WHEREAS, the population of the non-Toledo portions of the county have continued to expand at the expense of the city, and
>
> WHEREAS, the staff report "Whither Greater Toledo" predicts that without vigorous Commission action these trends will continue, resulting in decreasing environmental quality and tax base as well as increasing revenue demands and energy consumption, and
>
> WHEREAS, national population movements to the south and southwest and declining household size are expected to continue at least to the end of the decade, and
>
> WHEREAS, the Plan Commissions recognize the difficulty of reversing these trends, but recognize the need to take action to stabilize the population of the City of Toledo;

THEREFORE, the Toledo-Lucas County Plan Commissions adopt the following policy:

> That, the Toledo Comprehensive Plan Update, Zoning Code Update, and all other agency plans--current, neighborhood, and long range--be used on a population growth rate for the City of Toledo, equal to the projected county growth rate. As of 1976 the proportional population projections are:

	TOLEDO CITY			BALANCE LUCAS COUNTY			LUCAS COUNTY		
	No.	AAGR*	%	No.	AAGR	%	No.	AAGR	%
1970	383,062		79.2	100,489		20.8	483,551		100
1973	377,423	-.49	77.6	108,846	2.77	22.4	486,269	.19	100
1980	382,923	+.21	77.6	110,534	.22	22.4	493,457	.21	100
1990	392,654	.25	77.6	113,343	.25	22.4	505,997	.25	100
2000	401,939	.23	77.6	116,024	.23	22.4	517,963	.24	100

*AAGR = Average Annual Growth Rate

Historical Trends:

Toledo, Lucas County and Jerusalem Township have all shown a decrease in their annual population growth rates since 1920. The average annual growth rates per year over the last 50 years (1920-1970) are as follows:

Lucas County = 1.24

Toledo = 0.87

Balance-Lucas County (excluding Toledo) = 3.9

Jerusalem Township = 3.25

(When looking at the above figures it should be noted that annexation by Toledo caused greater fluctuations in population than would normally be experienced.)

Jerusalem Township's growth rates, from 1890 through 1978, are as listed on the following page:

POPULATION 1890-1978

Year	Population	Difference	Average Annual Growth Rate
1890	1166		
1900	1581	-411	-2.78
1910	1431	-150	-1.04
1920	1297	-134	- .93
1930	1739	+442	3.40
1940	1910	+171	.98
1950	2658	+748	3.91
1960	3319	+661	2.48
1970	3405	+96	.28
1978	3614	+209	.77

PERSONS PER DWELLING UNIT

Year	# Dwelling Units	Person's Per Dwelling Unit
1960	1176	2.82
1970	1018	3.35
1978	1134	3.19

An average of 12 dwelling units per year (1970-1978) have been built in Jerusalem Township.

Lucas County Population per dwelling unit for the year 2000 is projected at 2.8.

ASSUMPTIONS

THAT: The eastward growth pattern will continue toward, and eventually into, Jerusalem Township.

THAT: Toledo, Lucas County, and Balance of Lucas County's (excluding Toledo) growth rates will be proportional equal by 2000.

THAT: Jerusalem Township's annual growth rate will slow down and become stable as the population matures.

THAT: New construction in Jerusalem Township will continue steadily.

THAT: The persons per household will continue to decline in Lucas County, as well as Jerusalem Township.

POPULATION PROJECTIONS

JERUSALEM TOWNSHIP

Year	Population	Difference	Average Annual Growth Rate
1970	3405		
1978	3614		
1980	3686	72	1.0
1990	4034	348	.94
2000	4370	336	.83

Note: Based on an average of 12 new dwelling units per year with the following persons per dwelling unit: 1980--3.0 ppdu, 1990--2.9 ppdu, 2000--2.8 ppdu.